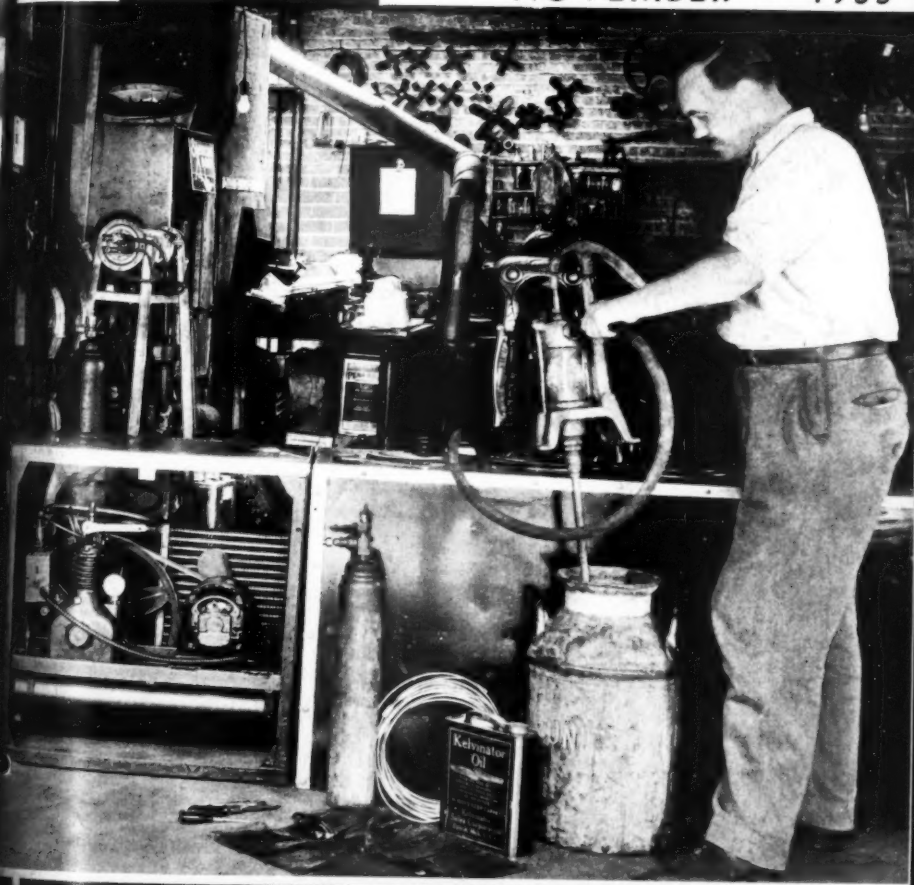


# Refrigeration Service Engineer

Vol. 3  
No. 11

NOVEMBER • 1935



Complete Report 2nd Annual R.S.E.S. Convention • Lubrication of Air Conditioning Equipment • Questions and Answers • Oil Separators

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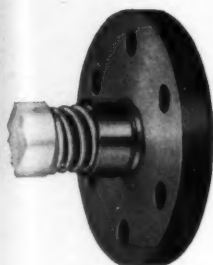
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145	Buckeye	$\frac{5}{8}$ "
150	Zerozone, 4 hole plate	$\frac{5}{8}$ "
155	Zerozone, 4 hole plate	$\frac{1}{2}$ "
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# The REFRIGERATION SERVICE ENGINEER

*Devoted to the Servicing of*  
REFRIGERATION UNITS and OIL BURNERS

VOL. 3

NOVEMBER, 1935

NO. 11

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# The Refrigeration Service Engineer

*A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners*

OFFICIAL ORGAN REFRIGERATION SERVICE ENGINEERS' SOCIETY

Vol. 3, No. 11

CHICAGO, NOVEMBER, 1935

\$2.00 per Annum

## *Second Annual Convention of Refrigeration Service Engineers' Society Huge Success*

**Educational Program, Visits to Manufacturing Plants, Manufacturers' Displays, Entertainment Features and Representative Attendance All Contributed to Success of Most Important Convention. New Officers Elected—Memphis Selected as 1936 Convention City.**

THEY came, they saw, they learned, they were all frank in their enthusiastic approval of every feature of the Second Annual Convention of the Refrigeration Service Engineers' Society held in Detroit, Mich., at the Fort Shelby Hotel, October 23, 24 and 25. All arrangements were completed on time, the program was carried out with clocklike precision, and every minute of the day was occupied for the delegates as well as the large number of ladies who were in evidence at this convention.

### **Wednesday Morning, October 23rd**

The convention was called to order by James H. Downs, president of Detroit Chapter and first vice-president of the National Society. In formally opening the convention he stated, "It was just a year ago that this Society held its first national convention in Chicago. At that time, very few of us had

the slightest idea as to just what a national convention could or would be. The Detroit delegation consisted of six men, and I think, outside of one Chapter which was located much closer to Chicago, we had the largest delegation there, but, in spite of that, we had a very fine turnout and a very successful convention. At that time, this Society was not considered a factor in the progress of the refrigeration industry. However, in the space of one year's time, our status has changed considerably. Manufacturers who formerly refused to even recognize our existence have discovered that our purposes and objects are in accord with theirs; that we are planning for the betterment of the industry as a whole.

"Not long ago, I talked with the advertising manager of a very large service organization in the automotive industry, and he told me that the secret of their success

might be attributed to three things: First, how to do a better job; next, how to do it cheaper; and third and most important, how to get more money for it. These three things seem to me to be the three principles underlying the success of this organization."

Mr. Downes then introduced and turned the meeting over to National President Thomas J. Fowler, who in turn introduced Mr. J. F. Nickerson, publisher of *THE REFRIGERATION SERVICE ENGINEER*, official organ of the Society.

President Fowler then delivered his address, as follows:

#### President's Address

*To the Officers and Members of the Refrigeration Service Engineers' Society:*

It is with pleasure that I welcome all of you, both members and visitors to this—our second annual convention.

Last year our first national convention was held in Chicago. At that time we had five chapters, and we enjoyed an attendance of between one hundred fifty to two hundred. A number of very prominent men in



JAMES H. DOWNES, Detroit  
President, R.S.E.S.



PAUL JACOBSEN, Chicago  
1st Vice-president



W. HALL MOSS, Memphis  
2nd Vice-president

Mr. Nickerson said in part that, in sponsoring this organization, there was a recognition for the need of a cooperative educational organization, and, with that end in view, a determined effort was put forth to get the service men together on some cooperative basis, not only in furtherance of the educational work of the Society, but also in making some cooperative effort in strengthening and stabilizing this business, which was showing a substantial growth each year. In continuing, he said, "The Society, of course, not only welcomes the independent service men, but also the service men who are employed by manufacturers and distributors of refrigerating equipment, and it is gratifying to note the splendid cooperation that is now being received from all of these classes."

Following Mr. Nickerson's address, President Fowler appointed Mr. J. E. Perry, of Detroit, temporary sergeant-at-arms for the convention meeting.

the refrigerating industry attended this meeting and the entire affair was marked with good fellowship, an eagerness to get acquainted with their fellow engineers, and to settle matters of importance.

During the year 1935 six more chapters have been organized, with inquiries from a number of cities who are anxious to organize.

At the close of the 1934 convention the National Society was nearly \$900 in debt. At the beginning of this convention we owe less than forty dollars. This reduction in debt has been accomplished during the last year, in addition to the additional cost of our educational work, the formation of six new chapters, together with the other expenses attached to a work of this kind.

You have your National Officers to thank for this record and especially your National Secretary, Mr. Harold McDermott.

We must not overlook that vast amount of work connected with the preparation of the 1935 educational papers, and considering that these services have been donated to the Society I feel that we owe a debt of gratitude to our educational committee, especially

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Mr. George H. Clark of Detroit chapter, chairman of this committee.

The Nickerson and Collins Publishing Company of Chicago deserve great praise for the wonderful magazine they are producing for us, and, after considering that they donate the services of their office to keep the books and all other records of this Society free of charge, we should feel very grateful to them for their service.

I trust that each member of this Society will do his utmost to get new members to join his chapter, and also do all within his power to encourage the forming of new chapters. The more members we have the

ahead, it is apparent that we should start to mold this Society into a form that will afford the greatest benefit to those who support it. During the short existence of this Society there has been considerable valuable work accomplished.

In addition to our regular educational course we should secure and put in the hands of each member complete data on every piece of refrigeration equipment manufactured in the past ten years.

In order to bring this about I suggest that a new department be set up, this department to be known as the Research Department, and to consist of one man who is fitted by



S. A. LEITNER, Kansas City  
National Treasurer



H. T. McDERMOTT, Chicago  
National Secretary



CLAUDE A. BRUNTON, Hunt-  
ington, W. Va.  
Sergeant-at-Arms

greater value the Society will be to each member.

Regarding the work of the committee on the adoption of standard refrigeration symbols, these symbols represent in pictures, the component parts of a refrigeration system. This seems to be a much needed requirement in the industry. However, I would like to make some suggestions—First, that any symbols that are in use today as standard symbols, such as electric fixtures, lines, switches, motors, pipe lines, and any other standard symbols be written into and used where permissible.

Second—that a committee be appointed at this convention to follow and push this work to a reality.

Third—that this committee cooperate with all interested bodies in the perfecting of these codes.

When the objects of this Society were first explained to me, it was apparent that it was a Society especially designed for those engaged in the servicing and repairing of refrigerating plants, and those allied to them. Now after two and one-half years of existence and an abundance of encouragement

education and experience and capable of successfully handling such an office. The man elected to this office must be an active member and preferably a man engaged in the servicing of refrigeration equipment.

The duties of this department will be to gather specifications and data on all types of refrigeration equipment, condense it to practical terms, print it on 6x9-inch loose leaf sheets and mail to each member in good standing.

He will be required to cooperate with the National President and Secretary and upon their recommendation will visit operating chapters and when necessary assist in the formation of new chapters. He will also be required to consult with the National Officers and Board of Directors and with them decide on what class of data is most urgent from time to time. He will also visit the manufacturing plants when necessary, to gather first hand data on the application and the servicing of their refrigeration equipment.

A man to fill this office will be elected by the delegates of the various chapters at each national convention.

This office will be paid a salary, the salary to be established at each convention in accordance with circumstances. The expenses necessitated by traveling, gathering data, printing and postage, incurred by this office together with the salary will be paid by the national body. It will probably not be possible to maintain this office on a full time basis the first year unless new chapters are formed in the near future or the dues be increased so that the national body will be provided with enough money to carry the work on permanently. However, the office could operate on a half-time basis for the time being and the necessary changes could be made later.



**E. A. PLESSKOTT, St. Louis**  
Member Board of Directors



**W. W. FARR, Cleveland**  
Member Board of Directors



**GEORGE H. CLARK, Chairman**  
National Educational and  
Examining Board

I feel reasonably assured that the manufacturers will cooperate with this Society in our endeavor to advance the efficiency of the service men as a whole. After all, the manufacturers will reap their reward from this method of education.

The foregoing suggestion may look like a large order. However, the information that can be gathered by this department would be priceless to the service man. And if each member of the Society were to pay ten dollars a year dues he would be getting many times its value in this perpetual educational course.

During the past year I have received a number of complaints pertaining to the methods pursued by parts dealers. The complaints appear to be justified, and I ask this convention to go on record and request the parts dealer to stop the practice of publishing net price catalogues and mailing them to every janitor and building engineer in the country.

I feel that the parts manufacturers, the parts distributors and the parts dealers are all interested in making the service business a paying business, and I trust that they will

hear our appeal and render whatever assistance they can.

President Fowler then appointed the following convention committees:

#### CREDENTIALS COMMITTEE

Mr. Chas. Eich, chairman, Youngstown, Ohio.  
Mr. Boyd Evans, Memphis, Tenn.  
Mr. R. F. Cox, St. Louis, Mo.

#### AUDITING COMMITTEE

Mr. Harry Drownes, chairman, Chicago, Ill.  
Mr. Paul Jacobsen, Chicago, Ill.

#### NOMINATING COMMITTEE

Mr. Harry Busby, chairman, Chicago, Ill.  
Mr. Harry McKerracher, Detroit, Mich.  
Mr. E. A. Plesskott, St. Louis, Mo.  
Mr. W. W. Farr, Cleveland, Ohio  
Mr. G. D. Wang, Milwaukee, Wisc.

#### RESOLUTIONS COMMITTEE

Mr. Claude Brunton, chairman, Huntington, W. Va.  
Mr. S. A. Leitner, Kansas City, Mo.  
Mr. E. J. Merenda, Brooklyn, N. Y.

#### GRIEVANCE COMMITTEE

Mr. W. H. Moss, chairman, Memphis, Tenn.  
Mr. G. D. Wang, Milwaukee, Wisc.  
Mr. Charles Hall, Akron, Ohio.

Following the committee announcements, the President called for the report of the National Secretary, Mr. H. T. McDermott, of Chicago, whose report in part was as follows:

#### Report of National Secretary

*To the Officers and Members of the Refrigeration Service Engineers' Society:*

In reporting to you the executive and financial matters of your Society as conducted by the Secretary's office, I do so with a sense of gratification for the definite accomplishments we can record this year.

May I preface my formal report by stating that one could not but recognize and



feel the harmonious spirit that has permeated the relationship between our national and local organizations during the past year, and for that matter since the inception of our Society.

Because it has been the speaker's privilege to have had close association with your National officers—I know how conscientiously they have endeavored to serve the Society in its various activities, keeping in mind at all times the best interest of our individual members. The manner in which the organization has been conducted, and the progress it has made during the past year, is a tribute to the administration that has guided this organization past another milestone.

It has been the speaker's privilege to have had the opportunity of visiting with practically every local chapter this year and to have assisted in the formation of several of our newer chapters, which will be reported at this meeting.

It is a pleasure for the national organization to report the progress which these individual chapters have made. The local officers who have been charged with the responsibility of carrying on the work of the individual chapters are to be commended for their excellent work.

This national convention, I believe, is concrete evidence of the progress which our organization has enjoyed during the past year, especially when we consider that it was just a year ago that the call was issued for the first national meeting of service men ever held. At that time we had the first opportunity to complete our national organization and to chart our course as to the future activities of the Society.

The success of this convention program is in no small part attributable to the efforts which the local Detroit Chapter has put forth under its convention committees.

Contributing also to the success of this convention is the splendid exhibit by the manufacturers, whose response to this feature of our convention is greatly appreciated.

### Program Arrangement

In compiling the program, the Committee has kept in mind the fact that our members will desire to devote as much time as possible to a close inspection of the exhibits, and ample time will be provided between the morning sessions and the various trips planned for the afternoons, as well as the entertainment this evening to give all ample opportunity to visit the various exhibits.

Like any good business organization, your national officers have been mindful of the fact that the success of a business or an organization is determined by its ability to maintain a properly balanced budget. As

an example of how well this has been done during a year of greatly increased activity as far as the spending of money is concerned, a comparison of our financial standing as of our last convention with that of the present year will be interesting.

At our last convention our bills payable exceeded our current assets by some \$900.00. At the end of this fiscal year, after paying our old bills, our current assets would enable us to pay all of our present indebtedness, within \$46.14.

There, of course, will be additional invoices payable for expense incurred in the holding of this convention, which had not been received prior to the closing of our books on October 1, 1935.

Again, let me impress the fact that we have this balance on hand after the liquidation of our old bills and the expense of producing the educational material published this year.

Our official organ—THE REFRIGERATION SERVICE ENGINEER—because of its widespread distribution, has again been a potent factor in acquainting prospective members with the objects of our organization as well as chronicling the events and happenings of the various local chapters, and as a consequence has been an important instrument in keeping our chapters, members-at-large and national organization closely related with each other.

### Chapter Operation

Your National Organization is rightfully concerned with the operation of its constituent chapters and, after all, the advancement of the National body is closely allied to the progress of each chapter. It is the object of your National Organization to correlate the activities of our entire organization, initiate constructive movements to better the interests of its members, to assist in the stabilization of the business and to encourage ethical standards of practice.

It is the purpose of the local chapters in carrying out the objects of the National Organization as promulgated in our Constitution and By-Laws to concern itself with the educational advancement of its members and to actively interest itself in matters as they affect locally the welfare of the members of the chapters.

Your National office is pleased to have been in a position to render a definite service to many members of our organization at their request, and particularly to report that we have been in a position to cooperate with many of the leading manufacturers. Their recognition of the purposes and objects of our organization is a testimonial to the constructive work we are accomplishing, and we likewise have appreciated the cooperation

which has been extended to our organization, and solicit their further assistance in the advancement of this profession in which we are all interested.

Up to and including our last convention, this organization comprised six local chapters, and reports of the institution of these chapters were given in my last report. Since our 1934 convention, I am pleased to report that the following chapters were formed and are now regularly constituted chapters of the National Organization: Akron, Youngstown, Cleveland, Kansas City, Memphis and Pittsburgh.

Immediately after the holding of our last annual meeting we had requests from various cities for the formation of local chapters.

On November 14, 1934, the service men of Akron, Ohio, held a meeting at which your National Secretary outlined the purposes and objects of the National Society, and at this meeting a formal application was made for a charter. Charter was granted December 19, 1934.

On November 15, 1934, formal application for a charter was received from Youngstown, Ohio, service men. On December 10, 1934, charter was granted.

On November 16, 1934, the service men of Cleveland, Ohio, made formal application for a charter, this being granted December 19, 1934.

On February 11, 1935, formal application for a charter was received from the service men of Memphis, Tennessee. Charter was granted March 20, 1935.

On March 1, 1935, Kansas City, Missouri, service men made formal application, and were granted a charter on April 10, 1935.

On March 18, 1935, formal application was made by service men of Pittsburgh, Pennsylvania.

In closing, it is my desire to express my appreciation for the helpful cooperation this office is receiving from our entire membership and to predict that our activities will during the coming year reflect in a greatly increased membership.

The report was received and approved as read.

Mr. George H. Clark, chairman of the National Educational and Examining Board, then addressed the delegates on the progress made in the 1935 educational program, and looking forward to 1936.

#### **Progress Made in the 1935 Educational Program and Looking Forward to 1936**

**By GEORGE H. CLARK**

I am the fellow that has some funny questions. I would just like to go into history a little bit. I didn't get up here to make a

speech. I merely want to talk to you boys, tell you a little bit about what we have done, or haven't done, whichever it is, and what we have in mind for the future.

We call ourselves refrigeration service engineers. Now that brings up the question, what is an engineer? The definition of an engineer that I like as well as any, is that an engineer is a man who applies technically educated common sense. Now if you haven't got the common sense, you are going to have a hard job to get along in your refrigeration service work. You need a certain amount of technical education in order to get along in your refrigeration service work. You may have a man who has plenty of common sense, plenty of mechanical ability, knows his electrical work, he may be a good plumber, he may be a good carpenter or a good blacksmith, still he isn't a refrigeration man.

There is a little of thermodynamics involved, whether we want to call it by that name or not. We want to understand our refrigerants. Consequently, in this educational work we have started in the fundamentals of refrigeration, what is heat, temperature, pressure? Those are things with which we are concerned in refrigeration.

Refrigeration is moving heat. If we don't know what that is, how can we thoroughly understand refrigeration? So in our lecture course we have started out at the very fundamentals of refrigeration, and tried to proceed logically through a study of refrigeration, and eventually we will work into some air conditioning.

#### **Fundamentals Covered**

So far we have covered the fundamentals. We have had one of our lecture courses which was entitled "The Study of a Simple Refrigerating System." It was not entitled a simple study of a refrigerating system, and perhaps it may have seemed that we have gone into a lot of theories there, more so than the ordinary refrigeration service man will ever be called on to undertake, but nevertheless we feel that a little bit of that does not do anybody any harm.

Now we have covered our program to this extent; that is we have covered the fundamentals, and then we start in and discuss the various types of refrigerating systems; that is those using capillary tubes, expansion valves, high and low-side floats, and that really constitutes about all the types of refrigerating systems we have in household systems. In multiple systems we don't have that many types. So we discussed the various types of refrigerating systems, then we go into a little more detail on the design and construction of condensing units, and then we work around into a more detailed study of the various parts of the condensing

unit, the compressor, the condenser and receiver. We haven't got into the motor work yet, but we will get into motors and wirings, and we have got as far I believe as a discussion of a pressure reducing device; that is particularly the automatic and thermostatic expansion valves. The rest of that will come along.

In the future we will work into methods of determining heat leakage through refrigerators, methods of determining coil sizes for refrigerators, and methods for deciding what size refrigerating machines should be used for a certain refrigerating job, and then we will work on into various methods of controlling temperature. For instance, we may have one machine that we want to operate several evaporators on, and maintain different temperatures in each evaporator. We want to go into detail on the various methods in which this can be accomplished, and as we get into a pretty thorough study of all the ramifications of that refrigeration, we will undertake to state what air conditioning consists of, how it is accomplished, and I believe you fellows will all eventually work into the air conditioning work, as air conditioning is probably going to be a thing as great as refrigeration, or greater, in itself, although you might say it is to a certain extent an outgrowth of refrigeration, at least the comfort cooling phase of air conditioning.

Now occasionally we have had fellows offer criticisms of our course; that is this lecture course, and we certainly can stand a little criticism. Sometimes we have had claims made that a few more practical discussions would be appreciated. On the other hand, sometimes the fellows claim we haven't gone enough into detail on some of the theories we have covered. Now it is kind of hard to reconcile these two attitudes all at one time, so that all we can do is this; have a plan of action here, that is an outline to go by, and stick with this outline.

Now if there is anything that you particularly desire covered, I think we will get around to it. We can't cover everything at once. Some fellow out in the West may have a particular problem; some fellow in the East has a different problem. We can't cover all of the problems at one time, but we will try and get around to them all, and if there are any you feel aren't covered adequately, please don't hesitate to write us and give us that information.

### Uniform Symbols

Following Mr. Clark's address the paper on the necessity for the adoption of uniform symbols in the refrigeration field, prepared by Mr. Herbert Herkimer and in whose absence was read by Mr. Stephen Leitner,

president of Kansas City Chapter, brought out the favorable response which had been received from the refrigeration field in general, to this important subject. The substance of this paper, together with the suggested symbols, appeared in the August, 1935, issue of THE REFRIGERATION SERVICE ENGINEER on page 5.

The report of the committee on uniform cost accounting systems was presented by Mr. Harry Downes, chairman of that committee.

### Report of Committee on Cost Accounting

By HARRY DROWNES

About eight months ago various discussions took place in Chicago Chapter relative to standardization of service rates and shop overhauls. Discussions resolved themselves into circles, because of the absence of any fact finding data on operation costs, which might be used in the adoption of uniform standardized practices.

The Cost Committee regrets its inability to present any real actual results accomplished within the last year, excepting possibly a well formulated plan which will make itself evident in the next few months, and which will be relayed to the members of the Society through their official organ. It might be well to mention at this time along what plans the present Cost Committee is working, and what the Committee proposes to furnish.

### Plans for 1935-1936

The Cost Committee takes full recognition of the fact that all members are not operators. But it also recognizes that the type of service man belonging to this Society is a potential operator.

Therefore, any plan adopted, will sooner or later be of interest to all the members, regardless of their individual pursuits at this time. Further, this committee is not interested in making bookkeepers out of its members. This statement becomes apparent, when we take into consideration that we have service companies employing service men, and we also have operators who do their own work and have neither service men nor an office. The bookkeeping requirements of either group can be adequately taken care of by the local stationery houses, who have regular stock in trade forms, that can be adapted to the individual requirements.

What the Committee proposes to do, is to furnish a cost sheet which is a part of the service form, and which is so simple and still complete enough, to adapt itself to the requirements of a service company or an individual operator. This service

form will show material, labor and shop overhaul revenue, and at the same time will provide facilities to show the cost of these same items. Provision will be made for the cost of repeat calls. A periodical compilation of these service forms will show the total revenue and the total cost. In this manner we will be able to obtain basic data to find out what the gross profit is. As a suggestion we claim that the gross profit should be at least 50% of the revenue derived. It must be borne in mind, that the gross profit on material sold is 50% of the selling price. In our business we sell service and are entitled to the same margin of gross profit.

An individual may not need a 50% gross profit inasmuch as his overhead is a negligible quantity, but this individual operator should demand the same percentage of gross profit, because in due time he will himself grow into an organization, and at that time will find himself embarrassed if he tries to charge higher prices.

As soon as the proposed service and cost sheet is ready, a copy thereof will be placed in our members' hands, together with full instructions regarding its use. We believe that it will be the first concrete step taken to arrive at some definite method of ascertaining costs. The eventual adoption of such a system will in no way tend to destroy the individual operator, but will be the positive means to make him grow into an organization. And of course the larger operators will benefit, because standardization automatically eliminates chiseling price cutters who admittedly are a menace to an organization which still believes in the basic right to work for profit.

Inquiries or suggestions from members are invited and should be addressed to the "Cost Committee," care of the National Headquarters of the Society.

The concluding paper for the morning session was presented by Mr. H. P. Scher on "The Advantages of a Universal Credit System for the Servicing Field." His proposal for the consideration of the Society was as follows:

#### The Advantages of a Universal Credit System for the Service Field

By H. P. SCHER

AFTER years of experience in the legal end of this industry, the subject which I am about to discuss, "The Advantages of a Universal Credit System for the Service Field," is of vital importance and cannot be taken lightly. There is rarely a day that problems pertaining to the industry do not

arise and the industry is faced with the necessity of answering such problems. The refrigeration service and refrigeration business as a whole is now in the embryo stages, with possibly the most brilliant future of any other industry known to mankind; a field of such wide dimension that it is physically impossible for us to comprehend at the first glance; a field which, if properly organized, will hold a most brilliant future for those who are now struggling in the industry.

Having had the pleasure of being associated with the work of Chicago Chapter, Refrigeration Service Engineers' Society, and having come in contact with thousands of debtors, I am able to discuss with you intelligently the value of a national organization. One of the important problems of the industry is to be able to determine when an account becomes delinquent. In the past, accounts have been held as long as three and four years and then suddenly an awakening takes place and a desire to collect the money is had. The account is then turned over and either we find that the debtor has moved, died, is unemployed or is on the charity rolls, and it becomes impossible to collect the money. The refrigeration industry is a very hazardous one and whenever an account becomes ninety days due and no payments received upon it, the account should be immediately turned over for attention. In the past when this rule has been followed by the Chapter in Chicago, we have been able to collect approximately 80% under today's conditions. With the proper cooperation of the membership in following this rule, this percentage can be increased, and it is, therefore, up to the individual member of this organization by taking all circumstances into consideration to determine the advisability of placing the account within ninety days for collection.

#### Many Excuses Given

In the many thousands of claims which I have handled pertaining to the refrigeration industry never have I had an open admittance from any one debtor irrespective of their position or station in life, that the debt was honest, but excuses after excuses are offered either from the standpoint that the work was done wrong, or that the merchandise was ruined while the work was being performed or hundreds of other excuses why the account should not be paid.

The credit pertaining to the industry is very similar in character to a doctor, lawyer, dentist or any other professional field where a service is rendered. When a man is in trouble and he makes a call for service if the proper protection was accorded the industry the bill would be paid immediately.

No complaint as a general rule is registered until such time as the account becomes delinquent and is turned over for collection.

The industry as it stands today is virtually totally unprotected and with the proper legal protection a great deal of the losses and delinquencies will be automatically eliminated and the industry no longer will be placed in a position of being compelled to take thousands of dollars of losses each year due solely to the lack of protection.

The proposition which we are about to submit for the approval of this organization at this Convention assembled, if adopted and the necessary cooperation given, will eliminate the evils which are now existing in this industry. "In Unity there is strength," and with this industry properly organized they will within a short period of time be recognized, and when it becomes necessary to have legislation passed they will then be in a position to demand recognition.

The proposed plan or proposition which we offer to this organization is as follows:

We intend to set up in the City of Chicago, which is a central point from all parts of the country, a National Legal Headquarters equipped with the proper facilities to give such service that will be necessary in handling the problems of the industry with dispatch and efficiency.

The method of procedure in this organization will necessitate the forwarding to the National Office all business pertaining to the industry, whether to be legal or commercial for its attention and inspection and the National Office will then advise the member as to what steps to take before being put to any additional expenses.

The National Office will maintain its own stationery exclusively for this organization and will forward from the National Office all communications to the debtors. If the debtors then fail to respond to the communications, the members will be advised whether or not immediate legal action is warranted.

#### Legal Counsel Available

Should legal action be necessary local counsel will be appointed in every city where a Chapter is located. This counsel will be selected by the National Headquarters and will at all times be under the National jurisdiction. He will handle any local item in cooperation with the National Headquarters.

The local counsel will be paid by the National Headquarters and all legal advice whether it be pertaining to legal or commercial business will be rendered without charge to the member and he will be properly advised as to what steps to take.

A uniform contract will be furnished by the National Headquarters in as great

amount as necessary to the member comprising every conceivable form of protection that the law permits in order to eliminate the necessity of inconveniencing the time of the member in appearing in Court to prosecute a claim, when suit becomes necessary. This contract will include a Cognovit to conform with the requirements of every State in the Union.

These will be furnished gratis to the members of each Chapter upon request to the National Headquarters.

In event any State forbids the use of a Cognovit, such protection equivalent to a Cognovit will be furnished that Chapter. We will also furnish gratis to the membership various forms best suited and those which give the greatest amount of legal protection to the industry.

We shall also see that all remittances are made within ten days from date of receipt of same, and said remittances are to be made direct from the National Offices.

The National Headquarters shall also establish in each city where a Chapter exists a credit service for the purpose of barring the dead-beat from securing service from any other member before first paying his delinquent accounts.

The rates of the commercial service will be the regular C.L.L.A. rates, a copy of the same to be furnished each member. No charge is to be made for any account unless collected.

All local counsel under the National jurisdiction will furnish free advice on any legal or commercial matter pertaining to the industry without charge to the member.

A periodical report is to be made from the National Office to all members having accounts in process of liquidation.

A monthly article is to be printed in cooperation with our magazine from the National Headquarters offering advice and suggestions as they arise in the industry, and also, the cure for such evils.

A card of introduction will be issued from the National Headquarters to all members entitling them to free advice from their local counsel.

The tax against each member in each Chapter which necessarily will arise for the maintenance of this service will be determined by your duly appointed committee.

In conclusion permit me to remind you that "In Unity there is Strength" and the Advantages of a Universal Credit System for the Service Field as heretofore set forth in my talk to you today cannot be disregarded or taken lightly. All live business organizations at times require in order to have the necessary protection for their industry to have certain laws passed or sometimes to stop the passage of certain laws; at such times a National Counsel and a Na-



tional Headquarters who know your requirements become indispensable.

In closing, Mr. Scher said he would suggest that if the plan meets with the approval of the Society, a committee be appointed for the purpose of discussing his proposal and suitable action.

President Fowler then stated that this matter would be referred to the Board of Directors for their final decision.

#### Wednesday Afternoon

In the afternoon, the delegates assembled to be transported for a visit to the Kelvinator plant, where 120 delegates attended a personally conducted tour of the various manufacturing operations in the production of Kelvinator household and commercial equipment. This proved a most interesting

part of the educational program of the convention.

The ladies were transported to Greenfield Village, where they had the opportunity of seeing the reconstructed historical village built by Henry Ford. Wives of the Detroit members acted as hostesses to the visiting ladies.

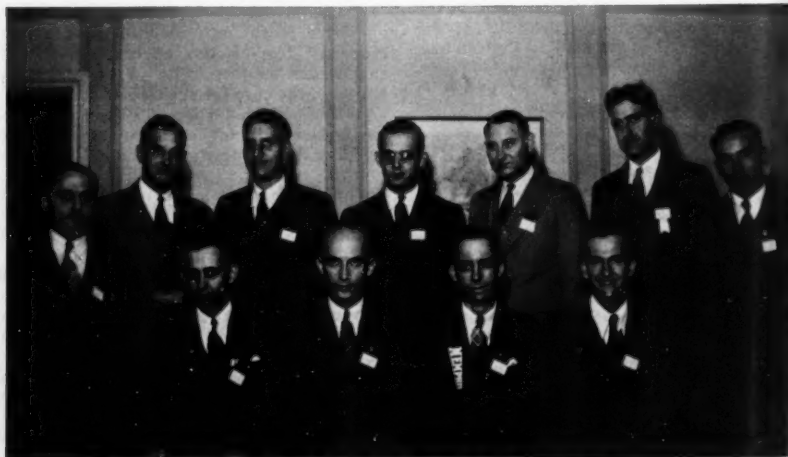
#### Wednesday Evening

In the evening, in order to provide all of the delegates in attendance with as much time as possible to inspect the manufacturers' exhibit, an Exhibitors' Frolic was held in the exhibition and meeting room, where a well-known Detroit orchestra provided music to keep everyone in high spirits. Thus ended a perfect day for the first sessions of the Second Annual Convention.

## Second Session—Thursday Morning, October 24

THE first speaker at the Thursday morning session was Mr. O. D. Greenlee, refrigeration engineer for the Kold-Hold Manufacturing Company, manufacturers of systems for refrigerated trucks. His subject, "Truck Refrigeration," included a preliminary discussion of the increasing use of refrigerated trucks in the transportation of

perishables and the necessity for rapid efficient servicing of the mechanical equipment when required. Mr. Greenlee said that the reason their company was so pleased to have the opportunity of addressing the Society at this annual convention was that they were often dependent upon service organizations for installations and service in the field and



A PART OF THE ST. LOUIS DELEGATION.





HERE ARE SOME OF THE MEMPHIS MEMBERS WHOSE ACTIVE WORK SECURED THE 1936 CONVENTION FOR MEMPHIS.

needed the cooperation of the service men throughout the country, and, in return, he believed their company could furnish a remunerative means for increasing the business activities of the servicing field.

#### First Refrigerated Trucks

In describing the Kold-Hold system, Mr. Greenlee stated, "Some of the first attempts at mechanical refrigeration for trucks were pretty sorry affairs. They were bulky, heavy, costly to install, expensive to operate and seldom dependable even if they furnished the result for which they were designed. Original attempts to drive the compressor took many forms. Gasoline engines were and still are used. In all fairness, we must acknowledge that the manufacturers of this kind of equipment have made great improvements. As far as Kold-Hold is concerned, there are many applications where power to drive a compressor while enroute is an absolute necessity. The same may be said generally of some types of power take-off and driven generators of sufficient capacity to furnish suitable electric current for the condensing unit motor.

"The Kold-Hold cooling unit may be described as a metal container with a large amount of effective cooling area, having

within its walls or sides, an evaporator coil of an improved and efficient design, the latter being surrounded by a known quantity of eutectic solution. This solution has a predetermined freezing and melting point, which is constant, and it has a known latent heat of fusion. Therefore, it is possible to calculate very accurately, the refrigerating effect under varying conditions. The Kold-Hold system may be aptly compared to a storage battery. Kold-Hold units store up refrigeration. In other words, the Kold-Hold units, after the solution within them has been solidified by the operation of an ordinary compressor, remain cold enough, long enough to provide the necessary refrigerating effect throughout the entire period of service without further mechanical operation.

"These units are charged or frozen at night while the truck is idle. Thus, only one operating period is necessary. There is nothing to load or unload. It is not necessary to unload the product in the body. I have stated that the solution within the unit when properly solidified would remain at a constant temperature long enough to supply the amount of refrigeration required. The eutectic solution which is used is known as



GROUP PICTURE OF THE ANNUAL BANQUET OF THE SOCIETY OF REFRIGERATION ENGINEERS, DETROIT, MICH., THURSDAY, OCTOBER 24, 1935

a true *cryohydrate*. A *cryohydrate* is a solid substance which will absorb a large amount of heat while passing from the solid to the liquid state, the temperature remaining constant during the entire period of melting."

#### Conducting a Service Operation for Profit

In introducing the next speaker at this session, President Fowler requested Vice-president Downs to introduce Mr. E. A. Seibert, director of service, Kelvinator Corporation, Detroit. Vice-president Downs, in presenting Mr. Seibert to the delegates, stated, "The next speaker on our program is

a man we are especially glad to welcome to our convention, and I think it is indicative of the progress that this Society has made that this man has consented to come and speak to us. His talk is 'Conducting a Service Operation for Profit.' Mr. Seibert's paper appears in full elsewhere in this issue.

#### Toxicity

One of the interesting papers of the convention was that presented by Mr. H. V. Higley on "Toxicity." Mr. Higley stated that, while most of the service men were familiar with the popular refrigerants they



ANQUET THE SECOND R.S.E.S. CONVENTION AT THE  
DETROIT MICH., THURSDAY, OCTOBER 24.

were handling daily, as to their operation in the refrigerating system, his paper would treat the matter in a slightly different manner than might be expected. Mr. Higley's paper in full will be found on another page in this issue.

#### **Our Future Progress**

Mr. Herman Goldberg was the next speaker on the morning program, on "Our Future Progress." In treating his subject, Mr. Goldberg stated, "The success which we have attained in our organization has been proven by the great attendance here from

all sections of the country, and also by the attendance of so many visitors who are interested in our activities. However, our past accomplishments are indeed small in comparison to what we may accomplish and to what will now be expected of us because of the leadership we have assumed.

"In all organizations, a certain quality or spirit must prevail, and the spirit of the R. S. E. S., as I see it, is to promote education, better feeling, greater understanding and more goodwill among the men engaged

*(Continued on Page 42)*

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# THE Question BOX

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

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THE following questions submitted to this department are answered by Mr. George H. Clark, chairman National Educational and Examining Board, Refrigeration Service Engineers Society. Have any readers other opinions regarding the problems involved. Send them to the Editor.

## TEMPERATURES

QUESTION 95. First, I would like to know which is the best means of obtaining different temperatures in different boxes with one condensing unit.

I have a market storage box to be kept about 40° F. and a drink box using water as conducting medium to cool drinks and milk to be kept at about 34° F. The storage box has a coil in it to operate on a defrosting cycle, using SO<sub>2</sub> as a refrigerant. I would set pressure switch to start at about 9 or 10 lbs. and stop at 8 inch vacuum. I would set my two-temperature valve in the suction line coming from the drink box to open at about 7 lbs. pressure and close at about balance pressure. That is all right provided the storage box is used enough to build up the pressure fast enough to start the machine before the drink box had time to warm up, and in practice this works out all right most of the time.

In case the pressure in the storage box didn't build up fast enough, I would have to put a two-temperature valve in the suction line coming from the storage box and set it at the same setting of the pressure control switch stated above and then set the pressure

control switch to cut out about 9 or 10 inch vacuum and cut in at the same pressure that the two-temperature on the drink box opens. That would provide accurate and definite temperatures, but the condensing unit would be out of balance with the load, would short cycle or pump too much oil. Could I not remedy the oil situation by installing an oil filter and float valve to return the oil to the crank case?

To get away from pressure switches and temperature valves, could I not use a thermostat for each box and a solenoid valve in each suction line that would open instantaneously as each thermostat would start the unit to running? Of course, I would have the same low suction pressure and oil pumping as I would with the pressure valves and switch.

Is there any solution that can be used as a bath to cool drinks and milk and can be lowered to a temperature of about 28° F. or any temperature lower, that won't have an odor or be unpleasant to put the hands in and is non-poisonous? I have trouble in getting the drinks cold enough without freezing them to the bottom of the cabinet or to the side. This creates a danger in getting the bottle loose, as it might break and cut the hands and then they are hard to get loose. If you could use a bath that would not freeze at about 28° F. and have the above qualities, it would aid the cooling of drinks in a bath considerably. That is one objection the dispensers have to cooling their drinks mechanically—they won't get cold fast enough and will stick to the box or cabinet that contains the bath.

In expanding the refrigerant into a brine that won't freeze at the operating temperatures, is it best to let the refrigerant enter the bottom of the brine and expand toward the top or enter the top and expand downward? It seems you would get brine circulation by expanding or entering at the top because the top of the brine would be cooler and would have a tendency to fall to the bottom, as it would be heavier than the brine at the bottom, and it would naturally be a little warmer. The above brine tank would not have an agitator to circulate the brine.

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*When the ice is frozen in an ice plant, doesn't the water start freezing at the bottom first, which is due to the brine being colder at the bottom than the top? In ice trays in domestic boxes, the water starts freezing at the top first, which is due to water being lighter from about 39° F. down to 32° F. than it is above this temperature, or the colder the water is between 39° F. and 32° F. the lighter it is. The reverse is true above 39° F. is it not? I have had a number of people tell me that hot water will freeze faster than cold water. I have never tried it to see, but it seems to me it stands to reason that it won't or can't, as the hotter the water the greater the total of heat to be removed before the water can reach the freezing point of 32° F.*

**ANSWER:** You state that you have a market storage box to be kept at a temperature of about 40° and a water bath to be maintained at about 34° for cooling drinks and milk. A storage box has a coil in it which is to operate on a defrosting cycle. I presume that the storage box and the water bath are both operated by means of thermostatic expansion valves. Among other things, you state that you maintain a temperature of about 34° in the water bath.

It is almost impossible to maintain this temperature unless ice is frozen solid in the bottom of the bath, insuring that a temperature of 32° is maintained at the bottom of the tank. In the usual ice and water bath, the water will be found to run at temperatures of 39° to 41°. A temperature of 32° may be very nearly maintained by putting a motor-driven agitator to continually circulate the water into the bath; but a temperature of 34° in a still water bath is very hard to obtain and hold.

If you find that a pressure variation of 8 inch vacuum to 9 lb. is necessary for the storage box and from zero to 7 lbs. for the cooking bath, it may be necessary to use two snap action valves set for each coil and then operate the pressure control somewhere in the range of from 10 inch vacuum to 5 or 6 lbs. pressure. Either coil will then start the machine as it demands refrigeration.

Perhaps a closer temperature range may be maintained in both the cooler and the

water bath by using temperature controls of the commercial type, which allow a small differential in temperature to be maintained. These could be operated in conjunction with solenoid valves and my suggestion would be to place these valves in the liquid line of each evaporator. Placing the valves in the liquid line has two advantages: first, that a smaller valve may be used, which cuts down the cost of the valve; second, it takes some little time after the valves are closed for the compressor to remove the liquid refrigerant from the evaporator and thus the suction pressure is reduced gradually.

Oil slugging is not caused so much by lowering the pressure to any definite point, as it is by the rapid lowering of pressures which does not enable the vapor to pass out of the oil slowly but causes it to come out quickly and the oil consequently foams in the crank case and a large part of this foam is turned back to liquid oil as it passes through the compressor.

If you want to maintain temperatures lower than 40° in a bath without the use of an agitator, I would suggest that you use a solution of glycerine in water. I would suggest about one gallon of glycerine to four gallons of water would be quite suitable for your purposes. A temperature of 28° as you suggest is, however, apt to be dangerous for milk; that is, it is apt to cause it to freeze.

Further in reference to the oil situation, if you are using dry type evaporators; that is, evaporators which consist of a continuous tube from the thermostatic expansion valve to the suction line, an oil trap is not so necessary, as the oil will be carried through the evaporator tubes by the vapor. If the evaporators are of the flooded type, an oil trap in the high pressure vapor line with a return to the crank case may be a decided advantage. In dry type evaporators which are to operate defrosting, it is usually an advantage to let the refrigerant enter the coil at the top and leave at the bottom. However, there is not very much choice between the two methods in connection with a water bath.

When the ice in an ice plant is frozen, it freezes at the bottom and sides of the tank

because that is where it is in direct contact with the cold walls of the tank, which are cooled by means of the circulating brine. In ice trays in domestic refrigerators, the water freezes first at the bottom of the trays in almost all cases, due to the mechanical contact of the tray and the evaporator passing heat from the tray to the evaporator. The water may then freeze a surface film of ice on the top, due to the low air temperature obtaining over the top of the tray and it then freezes in from the sides and bottom and also freezes down from the top.

There is a common idea that warm water will freeze quicker than cold water. This is largely an erroneous idea. There may be some slight difference in the amount of hardness in water due to boiling or heating which might affect the rate of freezing very, very slightly. Another thing, however, that does affect conditions to a great extent is the fact

that a tray of warm water put into an evaporator which is frosted will melt the frost in the evaporator and leave a film of water between the tray and the evaporator. As this cools down again, the tray is frozen into the evaporator and this frozen contact decreases the freezing time considerably.

In two identical evaporators, tests were made putting water in one tray of each evaporator at the same temperature and allowing the trays to freeze into the evaporator. After the trays had been frozen in, one of the trays was broken loose and then left in the evaporator. The tray which was not broken loose from the evaporator froze in about one-half the length of time that the other tray required, which had been broken loose, showing that the contact between evaporator and tray is usually the deciding factor in the rate of freezing ice.

## Automatic Oil Separators and Commercial Installations

Preventing Serious Difficulties by the Installation of Improved Oil Separators. The Author Discusses the Development of this Apparatus.

By FRANK RILEY\*

**D**URING the past fifteen years an intensive development and research has been carried on and millions of dollars spent in refining the small, or domestic refrigerating unit along well known principles which have been common to the commercial machines of the past seventy years.

It is safe to say that in the compression type of machines this research and development has been chiefly along the refinement of existing devices, or parts. The small machine has been made commercially successful principally through the development of three items: viz., automatic or thermostatic controls, the improvement in shaft sealing devices, and in the development or refinement of automatic and thermostatic metering valves.

\* Riley Engineering Corp.

It is also true in the development of various types of evaporators that almost as much time and effort has been spent in devising means for returning oil from the evaporator as has been expended in the development of the compressor itself and this item alone runs well into seven figures.

Oil traps were invariably used in connection with all large commercial machines and in all types of installations. It is true that they were, and still are, rather crude in design, but they served the purpose of keeping about three-quarters of the oil out of the low-side and these crude, hand-operated traps were, until recently, the only means available for the purpose, but we must remember that until very recently, all commercial machines were under the care of the owner or other attendant who watched the oil in the sight oil glass of the compressor



and in general supervised the operation of the entire installation. With the advent of the complete automatic installations it became increasingly necessary to find some means for trapping the oil, and in this statement, we mean all of the oil and not merely the large chunks (as one engineer aptly expressed the quantity, or proportion, separated out by the old style traps), but to separate the oil completely from the refrigerant and to return it automatically to the compressor as rapidly as it accumulates in the separator.

### Oil Problems

To revert again momentarily to the small machine field and the oil problems incident to them: Every man who has serviced the flooded types of evaporators knows that there has been plenty of trouble due to oil gathering in the evaporators, causing loss or entire stoppage of all refrigerating effect and usually necessitating the removal of the evaporator and purging it completely of its oil accumulation. This accumulation occurs regardless of the refrigerant used. It may be objected that not all evaporators gather oil in quantities sufficient to cause trouble, and we quite agree that this may be the case, but it is still maintained that this condition persists in enough installations to cause service troubles and costly dissatisfaction to the user.

The dry gas or direct expansion type of evaporator does not present the same train of oil servicing troubles, as it is comparatively easy to secure a good return of lubricant from these coils, particularly if there is no manifolding of coils from a header. With a single coil evaporator it would be idle to say that oil does not return to the compressor. However, there is always sufficient oil to coat the coil from one end to the other, thus cutting down the coil efficiency to some extent. Even in single coil evaporators the tubing can be so wound that numerous traps are formed that may, and frequently do, cause faulty operation as oil accumulates during the regular cycling of the unit in these loops or pockets.

In the small machine industry there have been proponents of various designs of evaporators. In fact, it might almost be said that

there are as many styles in evaporators as there are in women's hats and the styles change from time to time, just as they do in the bonnet business.

A dozen or so years ago, while connected with one of the then three or four prominent unit manufacturers making at that time nothing but domestic sulphur dioxide machines of the direct expansion type, it was decided to go into the ice cream cabinet field. Competitors were using flooded boilers with low-side floats but the management of the company which we will designate as the "A" Company said that "we are direct expansion people; we do not believe in flooded systems." However, after trying for several months to make their cabinets work on the direct expansion system without success, they finally changed to the low-side flooded coils. Then came the struggle to get the oil back from the boiler to the crank case and to find lubricants which were sufficiently soluble in the sulphur to keep the oil in solution so that the liquid receivers would not gradually fill with oil and thus starve the compressor.

Another concern using a high-side float evaporator with a long single tube evaporator with an accumulator at the outlet end of the coil, found considerable difficulty in securing the return of the oil, as it seemed to have the habit of remaining in the accumulator to the considerable disadvantage of the compressor, which found itself many times without lubricant of any kind.

### Return of Oil From Evaporator

Many schemes and devices were brought into use to bring the oil back, and dozens of patent applications were rushed into the patent office covering these various schemes, and it may be said that some of them had considerable merit. However, when it came to the multiple installations in apartment buildings with evaporators located at varying distances from the compressor, and at varying heights above the compressor, it was found that new problems of oil return began to show up in bewildering numbers. This condition was true regardless of whether sulphur or methyl was used as the refrigerant. Engineering attention was focused on bringing the oil back from the

evaporator instead of trying to prevent it from getting there in the first place, and that seems like going the wrong way around to get at the basic problem.

### New Companies Enter Field

From 1929 on, new companies began to spring up like mushrooms until in 1926 there were at least 175 concerns that were either actively making machines, or threatening to make them, and from that time until the present this number has increased and decreased almost like the ebb and flow of the tide, but nothing particularly new or of lasting benefit was contributed by this multitude of manufacturers to fundamental problems of keeping oil out of the low-side of the refrigerating system. Along in 1924-5-6 one company (then using Isobutane as a refrigerant with a direct expansion evaporator) decided that inasmuch as the oil and the refrigerant were apparently miscible in all proportions that it would be a good plan to keep the oil separated out of the Isobutane, or at least to separate it before the mixture reached the evaporator. Their engineers designed a float type oil separating device designed much along the lines of an automobile carburetor and with a single perforated steel plate serving as a collector for the oil. This simple device worked after a fashion and did separate out a great deal of the oil from the refrigerant and returned it automatically to the crank case. Two or three years later another company using methyl chloride as the refrigerant and with a low-side float evaporator of the flooded type, decided that it was necessary or advisable to keep oil from the evaporator, and so they designed quite a clever float device as a part of the compressor unit for returning the oil immediately to the compressor crank case. This device seemed to be fairly effective and actually did separate out a part of the oil, and very little oil trouble resulted, although it should be noted that the float type evaporators used by this concern at that time had the usual oil collecting devices incorporated in them.

Shortly after this time (1929-30) another concern developed a small float type oil separating device which depended merely on slowing down of the discharge gas velocity

in order to complete the separation of the oil from the refrigerant. This was better than no separator at all as this trap actually did separate out some of the oil but the difficulty here was that the float shell was entirely too small for anything but the very smallest compressor, and entirely too small for some of the units on which it was used.

### Oil Separation

Early in 1932 we began an intensive study of this oil separation problem and various schemes and devices were tried out. The plan was to separate out 100 per cent of the oil immediately after the discharge gas left the compressor and to return it quickly and without fail to the compressor crank case where it performs its only useful function. Not the least of the problems was to do this work in a small compact device, as space is very limited in the usual self-contained unit consisting of compressor, condenser, motor and liquid received on a single basis. Space is always crowded and there could be no room for a large bulky cylinder. Another consideration was the advisability of having all interior parts accessible for repair, cleaning, or other inspection. Various schemes for baffling the gas with multiple plates, plates with perforations, fine and coarse screens, metal and glass wool, asbestos, etc., etc., were all tried but there was still the necessity for getting at the float mechanism and too, there was the problem of selecting a float that would stand the pressures and yet not be too bulky. Due to the fact that these devices must be subject at all times to the discharge pressures, a needle with too large an orifice would overcome the floatation effect of the ball and the needle valve would remain closed.

The float ball finally decided on is approximately two inches in diameter. It is of steel and the halves are copper hydrogen welded into an almost perfect sphere. The orifice of the seat is approximately .055 and up to 195 lbs. head pressure, the ball will overcome the piston effect of pressure on the needle and the needle will lift from the seat and permit the flow of oil back to the compressor.

Now for the separating device itself: We found that in order to get complete separa-

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tion it was necessary for all of the discharge gas to impinge on an oily surface and to remain in contact with an oily surface, not merely instantly, but for an appreciable length of time, so our next step was to take a tube of a size larger than the inlet to the trap and place a spirally wound piece of metal strip in the upper end of the tube so that the gas would necessarily have to travel in a devious path around this spiral, and, as it left this part of the tube, the gas found itself in a more densely crowded section of metallic ribbon or shredded metal, where it was simply impossible for the gas to leave this jungle without contacting oily surfaces many, many times before it could reach the comparatively open spaces of the separator shell.

#### Boiling Point of Refrigerants and Oil

It must be understood that there is a difference of several hundred degrees in Fahrenheit temperature between the boiling point of any of the common refrigerants and any lubricating oil, and, while with some refrigerants we find that the oil mixes with it very readily and in almost all proportions, yet when relieved from pressure, the refrigerant will boil out very rapidly from the lubricant and, even under pressure, the oil will seek its own kind and gather readily on the oily surfaces. The mixture of gas and oil leaves the compressor in a heated condition and in a nebulous or foggy state. The refrigerant contains both the latent heat of evaporation and the heat of compression, which will be dropped in the condenser, but the oil has not, as yet, received any appreciable heat of vaporization and, consequently, has less heat to drop out and in passing through the separating tubes it is found by actual observation that there is a complete separation, but only when these tubes have sufficient area to accommodate all of the gas from the compressor without building up a restriction or back pressure, as it might be termed.

The problem was worked out successfully and with a resulting separation of approximately pure refrigerant gas, free from oil.

The problem had only begun with the completion of the first small separator. Larger compressors demanded larger separators and this meant larger separator tubes and finally

multiple tubes attached to a single header with a small dump trap separate from the main separator body.

#### Cost of Oil Separators

The question has frequently been asked: why, if these oil separators are so good and efficient are they not used by every unit manufacturer? It is an obviously fair question and deserves a fair answer. The real reason is that no unit manufacturer will add one penny to his compressor assembly cost unless his competitors use a similar device. Prices are highly competitive in the unit field and the addition of a few dollars to the factory cost is trebled by the time it is stepped up into a selling price to the user and the addition of fifteen dollars to a unit selling price frequently might mean the loss of a sale. And again, the unit manufacturer does not have to operate the machine after it is installed and if troubles arise due to lack of lubrication in the compressor, it is just too bad for the customer. The argument is made that no one else uses an oil separator, so why should any particular unit manufacturer burden his job with the cost of one?

This condition will not last always. It is the duty of the unit manufacturer to provide the obviously necessary parts to make his unit as highly efficient as it can be made, and shortly, we believe, you will see every commercial unit provided with a factory equipped oil separator.

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#### BOOK REVIEW

**OFFICIAL REFRIGERATION SERVICE MANUAL, VOL. 2.** By L. K. Wright. Published by Gernsback Publications, Inc. Flexible Binding. Illustrated. 352 pages. Price \$5.00. For sale by Nickerson & Collins Co., 433 N. Waller Ave., Chicago, Ill.

This volume, prepared especially for the presentation of the fundamentals, estimation, installation, maintenance and servicing of small unit refrigeration apparatus. Contains information on service; outlines of theory and methods of operation; instructions for handling refrigerants; charging systems; diagnosing troubles; trouble charts; electrical hookups; charges of oil and refrigerant in different models; advice on selection of oils; placement and temperatures required by foods; valve settings; compressor construction and overhauling; estimating coil and machine loads, etc.

# Conducting a Service Operation for Profit

Determining Costs Is One of the Most Important Considerations of the Service Operator. Two Main Divisions of Cost Must Be Determined—Direct or Productive Labor—Overhead or Burden.

By E. A. SEIBERT \*

**B**USINESS history has clearly proven that the one thing lacking, and the principal reason for loss of profits and ultimate failures in small businesses, is the lack of knowledge of just what constitutes the costs of doing business, and, on account of not having this knowledge, a great many men are rather critical of any suggestion that they don't know what their costs are.

To learn just what costs really are every item should be considered and taken into account. It isn't safe enough to trust to memory; they should be written down so none are forgotten.

In a business such as men of your organization are operating there are two main divisions of cost—

## Divisions of Costs

The *first* is the money you pay for the time of the men who do the actual service work. This is called: Direct or Productive Labor.

The *second* item is called overhead or burden.

The first is an easily determined item and is many times considered as the actual cost.

The second isn't so easily determined as it is made up of many items, but it must be carefully calculated if a correct cost is to be arrived at. I have heard a great many men, who should know better, say—"Oh, burden—that's just a bookkeeper's idea of how to make a job for himself." That man couldn't operate a peanut stand successfully. Overhead or burden cannot be ignored in even the smallest business without terribly pain-

ful results. Let's see what items are included in Burden:

First, comes Capital required. This costs you something. If you borrow you must pay interest. If you pay interest it is a charge against your business.

Then comes:

Rent—Heat—Light

Office Salaries—Office Equipment

Insurance—Taxes or Licenses

Shop Equipment—Supplies

Tools—Auto Expense (including gas, oil, tires, repairs, insurance and depreciation in value of car. You are all familiar with the difference between new car prices and trade-in value)

Loss of Accounts Receivable, or, in other words, bills you cannot collect. Do not forget you have paid someone to do the work so if you cannot collect you are out just that much; therefore, you must figure that item into your overhead, by figuring a certain percentage of your work will never be paid for.

Your monthly total of these items represents your overhead and to every hour of labor must be added a sufficient portion to completely absorb this overhead amount.

This may sound complicated but it isn't if you will think about it. It's just simple addition and division. You won't need a complicated set of books; a little experience will soon show you how simple it is and also how necessary to your future successful profit operation.

The next point to consider is parts and their actual cost. The cost of a part is: first, its purchase price; second, its stocking cost. By that I mean the freight, express, parcel post or other means of delivery, cost

\* Director of Service, Kelvinator Corp., Detroit, Michigan. Paper presented before R.S.E.S Convention, October 24, 1935.

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of bins, racks, etc., and the cost of selling, which is the delivery to job, office and sometimes collection costs.

Another very serious item of expense which is neglected in the majority of service companies is the item of lost, wasted, non-productive, or whatever you wish to call the time you pay your men for, but for which they do no work. This time consists of the time men spend around the shop in the morning before they go out on a job; wasted time between jobs; time lost returning for a part that was forgotten.

You will all be surprised how much this amounts to if you will carefully check this item.

In our own branches this item just about represented the difference between a loss and a profit. When we found a way to control the men's time we started to make a profit, and I am glad to tell you we make a fair profit in our Service Branches, not too much, but our percentage is quite satisfactory.

### Costs Applied to Service Operation

Now that we have covered all items of cost, how are they applied to a service operation is a question to be answered. The answer is not difficult to find. *First*, adopt a policy that you will play fair with your customers. *Second*, employ men who will do good work, work that you are proud to stand back of. *Third*, guarantee the work done. *Fourth*, use the best parts obtainable and not deceive your customers about parts used. *Fifth*, charge a fair rate for your services and for parts. Do not cut your prices just because somebody tells you he can get the work done for less by someone else. Perhaps the "someone else" is a man who is irresponsible, is only looking for the immediate dollar, and of course won't last long. Those fellows will come and go as long as machines are built.

I am sure that the greatest handicap your men will have to overcome in establishing yourselves in a community is the fear that the irresponsible will cut into your business. Just as soon as people know they are dealing with an honest, trustworthy, reliable and aggressive company they will help increase your business by telling their friends

about you. I know of a radio repair man who very seldom loses a customer, no matter what radio they have, just because he fixes the radio, and stands back of his work. His charges are at least as much, if not a little more, than most other similar men charge.

We now come to the subject of *collections*. There is no question that the only profitable method is to collect for a service call before leaving the customer's home. If collection is not made at that time your chances of collecting are not very good and even if you do collect, your cost of collection eats up all possible profit. Just figure up sometime the time, phone calls, stamps, paper, etc., you spend collecting two to three dollar items. You will find that it is just about as profitable to forget such items as to collect.

Of course, you will have some customers whose credit is good and with whom the volume of work you do is sufficiently large to permit you to render monthly or semi-monthly invoices. You cannot collect each time a call is made from such people as they would not possibly handle their business that way. When you do have such customers they should pay their bills for services rendered when they are due and you should insist upon it.

### Securing Business

It isn't enough that a man opens up a service company, tells a few of his friends that he is in the business and then sits down to wait. He will have to do some advertising. By that I do not, necessarily, mean newspaper advertising which, probably, would not do you much good in most cases, but you will have to do some house to house canvassing, personally soliciting business from people, leaving your telephone number and address and a card in some prominent place near the equipment so it will be convenient for them to call you.

After you have once secured a customer you should record his name, address and type of equipment very carefully. About once or twice a year you should send him a letter or, possibly, personally call upon him, see if there isn't something you can do and bring yourself to his attention again. Some means such as this will have to be employed



to build up your business. This is another item of cost that will have to be considered because you will have to get the money back that you spent. The only way you can get it back is through the labor and parts that you sell.

In going over all of these items and telling you what you should do I do not mean to infer that I know how to run your business. I don't. I am just telling you of the methods employed in a successful service operation and an operation that makes a very satisfactory profit—where the rates charged the customer are fair and have been reduced over the last several years, even though material costs and labor rates have risen. In these operations that I speak of a very careful record is kept of every item of expense. They stand on their own feet just exactly as you men will have to do. They are not subsidized in any way and the methods used in the operation of these service branches are just exactly the type of operation I am recommending for you. Nothing is left to chance. We know every day the amount of expenses we will have that day. We know from history about how much income we are going to get, so when the time comes when the expenses seem to be approaching a point where they are greater than the income, something has to be done immediately to increase the income and at the same time decrease the expenses so that a loss will not be shown. Some expenses cannot be decreased, so increasing the income is the thing of major importance.

I hope you men will not get the idea that the suggested method of operation is complicated, requiring a highly technical book-keeping system, because such a thing is not needed. It just requires sufficient bookkeeping to set down each item of expense so that you will know just exactly what that item is. After you have studied it for a couple of months you will find that you are able to do a lot of things that you could not do before because you were afraid that you were going to lose too much money.

You will be able to charge your customers a fair rate for your services and you can convince your customers that you are right.

I am quite sure you realize that if you are ignorant of the actual cost when your customers say your rates are too high you haven't a good selling argument. When you do actually know what your expenses are you can convince your customers you are charging a fair rate.

You men are particularly well situated in a good many instances to do a better selling job than a real large company because people like to do business on a personal basis. They realize that the man who is conducting his own business is generally a little more interested in the customer than some employee is. I want to thank your organization for an opportunity to appear before you and if these suggestions I have given you do you any good I will feel very well repaid.

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## PARTS MANUFACTURERS ORGANIZE ASSOCIATION

COINCIDENT with the annual convention of the Refrigeration Service Engineers' Society, the refrigeration parts manufacturers met in Detroit, October 23 and 24, to plan for a permanent organization of manufacturers to cooperate among themselves in establishing a higher plane of distribution for their products and to encourage and support legitimate distributing outlets for their products. This tentative meeting, it is planned, will be followed up by another meeting to be called within a short time to complete the organization and to adopt a formal constitution and present a code of ethics for the Association members to follow and consider.

Mr. J. D. Colyer, of the Wolverine Tube Company, was selected as chairman of the Board of Directors, and appointed Frank J. Gleason as secretary during the formative period of the organization. Other members constituting the Board of Directors include: C. M. Brown, Tecumseh Products Co., Tecumseh, Mich.; David H. Daskal, Perfection Gear Co., Harvey, Ill.; J. B. Forbes, Kerotest Manufacturing Co., Pittsburgh, Pa.; H. V. Higley, Ansul Chemical Co., Marinette, Wis.; L. U. Larkia,

(Continued on Page 52)



# Toxicity

The Author Discusses the Effects of Refrigerants on the Men on the Firing Line Handling These Gases Daily—the Service Engineer.

By H. V. HIGLEY \*

AS refrigeration has developed during the last decade, many people have become acquainted with refrigerants who previously had little if any interest in chemistry. The only gas intended for human consumption internally is a mixture of about 21% oxygen and 79% nitrogen, which is the approximate mixture in the air we breathe throughout our entire lives. Because a variety of gases contaminate the air, due to our more complicated existence today, interest is increasingly focused on the effects produced when man breathes such mixtures. Referring particularly to refrigerants, the question that is usually discussed is, "In case of accidental discharge, what effect will refrigerants have on the public, who are owners or are in the vicinity of refrigerating machines?" Most of us will agree, I am sure, that the public hazard involved is extremely small. There are approximately eight million domestic and small commercial machines operating with sulphur dioxide, methyl chloride and other refrigerants, to say nothing of the large number of higher tonnage commercial installations that employ the older refrigerants, principally ammonia and carbon dioxide.

I want to discuss this question today from a different angle. Let us confine our attention to the question, "What effect do various gases have on those who are handling these gases daily in varying concentrations and under a great variety of conditions?" And outside of the employees of the manufacturers of these gases and machines using these gases as refrigerants, our talk narrows down to the effect on the service engineers, the men who are actually on the firing line.

Let me say at the start, that I am in no way posing as an authority on this subject.

I have been very much interested in it, have studied it, and felt that a subject that contained such an amount of personal interest would be well worth a short time on your program. Because of lack of knowledge, I must necessarily stay away from high sounding medical terms. Bear in mind that we are not comparing gases as to their efficiency or adaptability as refrigerants. I will try to stick to toxicity facts and will have no thought of proving that any refrigerant is better than another.

## "Toxicity" a Broad Term

The word "toxicity" is a very broad term, covering that tendency of any substance to injure or destroy life if admitted through certain channels to the interior of our bodies. The range covered by the possible meaning of this word is almost unlimited. A certain quantity of food or beverage may be entirely beneficial. However, most of us have tolerances, and when we overstep these limits, the ordinary substance taken in excess is toxic to our system. This applies to candy, liquor or almost any food. I will not take time to emphasize this fact, as it is too well known to all of us. On the other hand, the word "toxicity" is used to express the effect of the deadliest poisons. It is quite impossible to properly compare effects under such a broad term, when it can and does have such a variety of meanings. I must confess before going further, that I have no basic system of comparison to offer today. We are, of course, limiting ourselves to consideration of gases only that may be taken into our bodies by means of the lungs.

Even when we limit toxicity to gases that we may breathe, we still have possible extremes of thought. Let me list some of the kinds of gases which are toxic in varying degrees and with very different effects.

\* Secretary of the Ansul Chemical Co.

First, we have the lethal gas, such as carbon monoxide, hydrogen sulphide, hydrogen cyanide, all insidious killers. We have the tear gases or lachrymators, such as chloropicrin, that produce a choking, gasping sensation associated with gas warfare. We also have gases that are anesthetic, merciful agents in the hands of experienced surgeons, but deadly in the hands of the inexperienced or evil-intentioned. There are the nauseating gases, such as butyl mercaptan, that chemical which makes a skunk a skunk in any language. There are gases that paralyze respiration, such as phosgene. Toxicity refers to asphyxiating gases, and let me enumerate several ways in which gas may produce asphyxiation. First, one may breathe a mixture harmless otherwise, but too low in oxygen to support life. Second, one may breathe a gas such as mustard gas that destroys the lungs so that oxygen does not reach the blood. Third, a gas such as phosgene, causes severe edema or congestion of the lungs so that they fill up with a watery fluid, shutting off the travel of air to the blood. Fourth, we have a gas such as carbon monoxide that combines with the hemoglobin of the blood, displacing oxygen so that the blood carries no oxygen to the tissues, causing asphyxiation. Fifth, we may breathe a gas like hydrocyanic acid that renders the body tissues incapable of using the oxygen that is available, causing asphyxiation.

#### Susceptibility to Gases

I think this whole subject of toxicity will be easier to consider as it applies to our daily lives and occupations if we have a definite picture in our minds of the functioning of our lungs and blood circulation. As you know, the oxygen in the air admitted to the lungs is taken up by the blood and carried to all parts of the body. Tissues use the oxygen to produce energy, carbon dioxide being formed principally. This carbon dioxide is taken up by the blood, returned to the lungs and eliminated from the body as expired breath. Let me add here that susceptibility to gases depends a great deal on personal sensitivities or idiosyncrasies. Just as some people have hay fever, others do not. Some find it impossible to

eat strawberries, while others can eat all they want. Some find poison ivy deadly, while others can handle it with complete immunity; so also, gases affect some people more than others.

A diagrammatic drawing of the respiratory tract is shown in Fig. 1. When we breathe, air is drawn through the mouth or nose down into the trachea, which is a tube about four inches long and one-half inch in diameter, covered with about 16 to 20 horse-shoe shaped cartilage rings to prevent the tube from collapsing. The trachea divides into two main branches called bronchi, one leading to the right lung and the other to the left. The bronchi are further divided and subdivided many times, the smaller tubes being called the bronchioles. The final and most minute subdivisions are called alveoli. When you consider that there are about three million of these capillary air tubes in each lung, you will appreciate their fineness.

The lungs fairly well fill the chest as shown, with the heart located between and slightly to the left. Between the lungs and stomach is the diaphragm, a sheet of muscle, convex to the thorax. When the diaphragm contracts downward, with the ribs moving outward and upward, caused by a muscular effort, a vacuum is produced by the expanding lungs and air is drawn in, or, in other words, we breathe in air, an inspiration. Expiration or breathing out of air, is accomplished without muscular effort. The muscles relax, and the elasticity of the lungs tends to drive out air. This is assisted, when a person is standing or sitting, by the weight of the thorax and when a person is lying on his back, by the weight of the stomach and liver. Resistance to breathing in of air can be tolerated to a certain degree. A pressure of more than two centimeters of water against breathing out of air proves to be very distressing.

Each lung has a capacity of about  $3\frac{1}{4}$  to  $3\frac{1}{2}$  pints, the right lung being slightly larger. When filled to capacity with air, the lungs hold about five quarts each. At rest, a person normally breathes in or inspires about  $\frac{1}{4}$  cubic foot per minute. Under exertion, this may be increased five to ten

times. We breathe 7 to 23 times per minute, the frequency varying indirectly with the depth or quantity of air per breath.

The very fine ends of the lungs, which are called alveoli, have exceedingly thin walls of delicate elastic framework, almost completely filled with a network of capillary blood vessels, and covered only by an ex-

capillaries in each lung. Here the carbon dioxide is released and a charge of oxygen picked up. The capillaries unite into increasingly large vessels, passing as one tube into the left side of the heart, which pumps the blood through the aorta to all parts of the body. The blood delivers the oxygen to the tissues as required, picks up the avail-

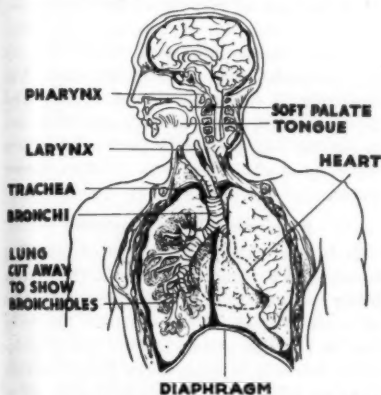


FIG. 1.—DIAGRAMMATIC DRAWING OF THE RESPIRATORY TRACT.

remely thin membrane. It is between the air in the alveoli and blood in the capillary vessels that the gaseous exchange takes place. Oxygen is continuously passing from the lungs to the blood, and carbon dioxide from the blood to the lungs, a remarkably delicate and dependable system that fortunately works with almost unbelievable precision. Owing to the thinness of the walls and the enormous total surface of the capillaries (estimated at 90 sq. meters, equivalent to 968 sq. ft. in the lungs of a man), the exchange or diffusion of gases is so rapid, that there is a virtual equilibrium of the partial pressure of every gas between the blood in the capillaries and the air in the alveoli.

### The Circulatory System

To complete the understanding of this transfer and the use of oxygen in the body, let us look for a moment at Fig. 2 showing the circulatory system. Blood which has accomplished its work in the body, and bearing its load of carbon dioxide, is returned to the right heart and pumped through the

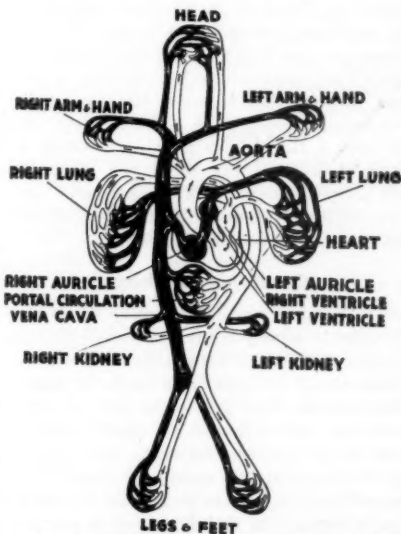


FIG. 2.—CHART SHOWING CIRCULATORY SYSTEM.

able carbon dioxide and returns to the heart. The complete circuit is made in less than one-half minute. Twenty per cent of the tissues get eighty per cent of the blood, the largest proportion being required by the glands and brain. The muscle, bone and fat use a lesser percentage. The active carrying agent in the blood is the hemoglobin, the red cells made up chemically largely of iron. The hemoglobin has three functions: (1) It combines with oxygen and gives it up readily; (2) it provides alkali to allow formation of alkali bicarbonate for transportation of carbon dioxide; (3) it takes up and gives off alkali so readily, being itself a very weak acid, that it maintains the acid alkali balance of the blood within very narrow limits. The other cells in the blood, the white cells, many in number and bearing rather formidable names,

are the protective or healing cells. They travel to any part of the body where there is infection and swallow up the invading germs. Their number is relatively small normally, but there is a very rapid increase at the time of infection.

The oxygen delivered to the tissues is of course used up in producing the energy required by the body in all of its functions. It can be expressed in heat units. For instance, a man weighing 150 lbs. requires 4 B.t.u.'s per minute when he is resting in bed and fasting; that is, when his stomach is not busy digesting food. When sitting up, he uses 6 B.t.u.'s per minute; standing 7 B.t.u.'s; walking two miles per hour, 12 B.t.u.'s per minute; walking four miles per hour 23 B.t.u.'s; slow run 40 B.t.u.'s; and for maximum exertion, 56 to 80 B.t.u.'s.

### Quantity of Breathing

The regulation of the quantity of air we breathe is almost entirely effected by the carbon dioxide, the percentage of which remains almost constant in the air in the lungs. The reserve of oxygen in the body is sufficient for only a five or six minute supply, and it is, therefore, fortunate that oxygen is not the governing agent. We must have something that acts more like the fly wheel on machinery, so that breathing is carried over any period when the oxygen supply is insufficient. The carbon dioxide acts as this particular wheel. The slightest increase or decrease of the carbon dioxide formed in the body induces almost immediately a proportional increase or decrease in breathing. When we exercise, more oxygen is required by the tissues involved, more carbon dioxide is formed, breathing is instantly increased, and more oxygen is available to make up a possible deficit. The air we breathe, as stated before, contains twenty-one per cent by volume oxygen. The expired air has lost five per cent oxygen, but contains about four per cent carbon dioxide. The difference of one per cent is accounted for by the fact that some of the oxygen is used to oxidize elements other than carbon, such as the hydrogen of fats, and the sulphur in proteins. Breathing is of course almost entirely involuntary, as the carbon dioxide provides complete control. The average person can

hold their breath only 30 to 50 seconds. If they take a breath of pure oxygen, it is possible that they can hold their breath somewhat longer. If you breathe deep and fast for about 30 seconds, you will find that you will then have no desire to breathe for a short time. By doing this, you could undoubtedly hold your breath for two or three minutes. If at the end of this forced breathing, you fill your lungs with oxygen, you can probably hold your breath two or three times as long or perhaps six or seven minutes. Undoubtedly, it was some system of this kind that permitted Houdini, the remarkable magician, to hold his breath such a long time while he made miraculous escapes under water.

### Respiration Is Reciprocating

It is interesting to note that respiration is on a strictly engineering basis, the system being reciprocating, a rhythmic alternation of contractions and relaxations. The body has no function employing the rotary principle, unless it be when a girl flirts and rolls her eyes. The wink, however, is more effective, and is reciprocating, usually. Most of these actions are involuntary: breathing, walking, chewing, even playing the piano, driving a car, etc. And these reciprocating actions are never jammed or dead-centered, and seldom out of balance. The impulse for these muscular movements comes over motor nerves from the spinal column. These control nerves are, therefore, like the electric sparking apparatus in a gasoline motor. There is a central control, a sort of super-telephone switchboard, where all impulses are sorted, and proper instructions issued. This is located in the lower part of the brain.

The percentage of oxygen in the air we breathe is not so important, provided it does not decrease too much. The normal is twenty-one per cent. It can drop to sixteen per cent without noticeable discomfiture, although a candle will go out in such an atmosphere. At twelve per cent, there may be no discomfiture, but an increase in pulse and breathing, muscular effort becomes more difficult, judgment is diminished, the mind confused. At six to nine per cent, unconsciousness. Mountain sickness is the result of lack of oxygen, with CO<sub>2</sub> developed re-

maintaining the same. A badly ventilated room does not produce discomfort because of too much carbon dioxide, as is often believed. Expired air contains about six per cent moisture, and is warmed. It is, therefore, lighter than normal air. The unpleasantness is due to heat, moisture and odors not resulting from respiration. The percentage of carbon dioxide is too small to make a difference.

When we breathe, there is, of course, considerable dead air space in the mouth and trachea where the air enters and leaves without functioning in the lungs. About one-third of each breath is not used in any way.

### Action of Gases When Breathed

In conclusion, I will attempt to explain the action of various gases when breathed. Please note the wide variety of effects. You will see how futile it is to make comparisons in cold figures to show toxicity. The warning action of a gas, the ability to detect a leak, the kind and degree of action resulting, the after-effects, etc., all these must be taken into consideration. It must also be borne in mind that, while the original gas may be relatively harmless, it may change to a harmful chemical, or it may be decomposed, by heat or flame, to harmful gases before it is breathed.

Let us consider irritants first, for their action is perhaps easiest to understand. Do not confuse irritation with corrosion. Irritation results in inflammation, which is a disturbance of the tissues and their normal functioning. There is a great difference in the way irritants act when breathed, and this difference varies with their physical properties. Their solubility in water is one of the determining factors. Soluble gases react with the moist tissues, which they first meet in the upper throat and trachea, and for this reason the resulting danger is less, for the upper tracts are tougher. The nose may be almost raw and still heal quickly and completely. The nearer the effect approaches the lungs, the more complicated and dangerous it becomes. The less soluble gases are, therefore, more dangerous. Usually these irritants react chemically and expend their ill-doing proclivities in inflaming tis-

sues. They seldom go into the blood in their original state, or, if they do, no further damage results. Irritants in the upper tract cause pharyngitis and laryngitis; lower down, bronchitis; and in the lungs, edema or congestion.

After severe exposure to any gas, care should be exercised against infection. One's resistance may be lowered so that disease may become active. The gases will not cause tuberculosis, but an inactive case might become active if bodily resistance made one susceptible.

### Ammonia

Ammonia reacts almost entirely in the upper trachea, causing spasms or edema of the larynx, which may be very serious. Sulphur dioxide reacts mainly in the upper respiratory tract, limiting its action to irritation of the surface tissues. Severe exposure would naturally result in the inflammation extending deeper in the lungs to the bronchi or to the lungs proper, causing edema. Sulphur dioxide has no cumulative effect. It does not react with the hemoglobin of the blood. If carried by the blood, it is taken up and eliminated by the kidneys. Both of these gases give warning of their presence in most minute concentrations. Leaks are easily located, and, therefore, cases of acute irritation are rare in spite of the fact that these gases are used so extensively in millions of machines. In the presence of flame, sulphur dioxide will not break down. Ammonia burns to nitrogen and water, both harmless.

### Methyl Chloride

Methyl chloride is not an irritant in itself. It goes into the blood stream, and may cause some anaesthesia. It reacts on the nerve tissues entirely. It hydrolyses to methyl alcohol, which is not as readily eliminated from the system as ethyl alcohol, with which many of you are undoubtedly familiar. It may decompose under heat to  $\text{CO}_2$  and  $\text{HCl}$ , but absolutely no  $\text{CoCl}_2$ . A trace of carbon monoxide may be formed.  $\text{HCl}$  is an irritant that tends to act on the middle of the respiratory tract, falling somewhat into the class with sulphur dioxide.



### Methylene Chloride

Methylene chloride is usually classed as a volatile drug. Its action is probably like that of methyl chloride. However, there is one difference that must be mentioned. When methylene chloride breaks down under heat, it forms HCl, CO<sub>2</sub> and phosgene. It is, therefore, interesting to note the effect of this last mentioned gas. It does not act on the upper respiratory tract, but works down in the alveoli. It was one of the principal war gases. Not making its presence known by irritation, it can be present in lethal concentrations without warning. Twenty-five p.p.m. are considered dangerous for even a short space of time. It induces severe pulmonary edema, an excessive secretion of watery fluid. The victim drowns in this secretion in his lungs, as air cannot of course reach the blood.

### Hydrocarbons

The chloro-fluoro derivatives of hydrocarbons, such as F12, are generally regarded as very safe refrigerants, except that here again we must take into consideration the results of a breakdown when the gas comes into contact with a flame. Phosgene is formed in appreciable percentage, and we have just described its effects. Also, HCl and Hf are formed. The latter is one of the most corrosive acids we have, and its action very serious. In addition to reacting on the lungs, it tends to form ulcers in the lungs, that are very difficult to heal. These products of combustion, HCl, Hf and CoCl<sub>2</sub> are more dangerous than any gases now used as refrigerants.

### Phosgene

The dangerous effect of phosgene in peacetime pursuits was first demonstrated in the use of what was supposed to be a perfectly harmless carbon tetrachloride fire extinguisher. For some time, deaths which occurred during fires where these extinguishers were used were not explainable, but it was found that the carbon tetrachloride broke down into phosgene and was responsible for the deaths. The fact that harmless materials may break down into very harmful gases in a fire was also well demonstrated in the Cleveland clinic disaster, which you

may recall. Here, nitro cellulose film burned and produced nitrous oxide, phosgene and carbon monoxide. About 100 people lost their lives in this fire.

Let me add two other gases, with which you are familiar though they are not used as refrigerants. They serve to show other types of reaction in the lungs or body. Most of you are familiar with HCN, which is used primarily for fumigating work, and is known as a most deadly gas. It has little odor or taste and, therefore, is very treacherous. Its action is to arrest the activity of all living matter. The cyanide is carried by the blood to the tissues, and the tissues cease to function, or use oxygen. The result is an internal asphyxia. The blood in the veins is red, in a victim, for the oxygen has not been used. In ordinary cases of cyanide poisoning, the man falls after a few breaths and death follows in 6 to 8 minutes.

### Carbon Monoxide

Let us conclude with mentioning carbon monoxide, a gas that has a slight garlic odor not normally noticeable. This gas is a real threat in every day life and actually takes its daily toll. Illuminating gas contains 20 to 30 per cent, coal gas four to six per cent. It is present in coal fires, house heaters, water heaters, burning buildings. It is the "after damp" present after mine explosions. It is ordinarily formed from the incomplete combustion of carbonaceous matter. The exhaust from auto engines contains one to seven per cent, equivalent to one cubic foot per minute per 20-hp. This is sufficient to make a one car garage with closed doors deadly in five minutes. In congested traffic, the concentration may reach 100 p.p.m., enough to cause a headache. Carbon monoxide unites with the blood to the exclusion of oxygen. The attraction of hemoglobin for carbon monoxide is about 300 times that for oxygen. The net result is, therefore, acute asphyxia. In the blood, CO does not oxidize to CO<sub>2</sub>, and, therefore, it must be slowly eliminated through the lungs. The proper treatment for anyone suffering with carbon monoxide poisoning is: first, to remove them to the



fresh air, and lay them on their stomach with their face to one side. If the person is still breathing, they should be fed oxygen mixed with seven per cent of carbon dioxide. The carbon dioxide stimulates breathing and the oxygen replaces the carbon monoxide in the blood. If the victim is not breathing, artificial respiration must be used, supplemented by the oxygen-carbon dioxide treatment. Drugs are of no benefit and alcohol as a stimulant should not be used.

To many people, there is considerable mystery as to the effects produced when gases other than air are breathed. This feeling of mystery results in an excessive fear of the consequences, a mental attitude that has no basis on facts, but is conjured up from lack of knowledge or from comparisons with unrelated incidents or circumstances. Nature is a most marvelous healer. The physician is her able assistant. Both, however, obtain best results when their patient is not laboring under some misconception of their ailment.

All industries have hazards. An external injury such as a cut finger is common. The victim has his wound dressed, and is convinced that it will quickly heal. If he has an overdose of one of the ordinary refrigerant gases, he should feel equally certain that the effects will be eliminated by proper care. History proves this to be true.

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## SUPPLY JOBBERS ORGANIZE ASSOCIATION

AS a large number of jobbers of refrigeration supplies were attending the convention of the Refrigeration Service Engineers' Society, it provided an opportunity for a meeting of these jobbers to consider the formation of an organization to serve this particular group.

As a consequence of the meetings held, the National Refrigeration Supplies Wholesalers Association was formed, which adopted a constitution and by-laws and elected a Board of Directors consisting of nine members, who in turn selected the officers of the Association from its ranks. The Directors elected for one, two and three years, to guide the affairs of the new Association are as follows:

For one year: W. C. Griesser, Refrigeration

Equipment & Supply Co., Chicago, Ill.; H. W. Small, Thermal Service Co., Inc., St. Paul, Minn.; Howell E. Adams, Lewis Supply Co., Memphis, Tenn.

For two years: J. M. Oberc, J. M. Oberc, Inc., Detroit, Mich.; Robert Spangler, The Spangler Co., Inc., St. Louis, Mo.; H. W. Blythe, H. W. Blythe Co., Chicago, Ill.

For three years: H. S. McCloud, Williams & Co., Inc., Pittsburgh, Pa.; Chas. A. Kabat, Paramount Electric Supply Co., New York City; Irving C. Alter, Harry Alter Co., Chicago, Ill.

The Directors selected from this group the following officers to serve for the ensuing year:

President, H. S. McCloud, Pittsburgh, Pa.

Vice-president, C. A. Kabat, New York, N. Y.

Treasurer, H. W. Blythe, Chicago, Ill.

Secretary, J. M. Oberc, Detroit, Mich.

The first meetings of the Association were concerned principally with defining the jobber, and the tentative definition adopted was as follows:

1. A jobber is a person or company, who purchases merchandise (refrigeration) from at least five (5) manufacturers and resells same to service men, distributors, dealers, or the trade.
2. No jobber shall operate a service shop or organization, except for the trade, and no jobber shall do retail work.

Later the definition of a jobber suggested by the newly-formed manufacturers' association was tentatively accepted by the jobbers' organization. (See report of manufacturers' association.)

The personnel of the various committees participating in the organization of this Association included:

Nomination Committee: H. W. Small, Thermal Service Co., Inc., St. Paul, Minn.; W. C. Du Comb, W. C. Du Comb, Inc., Detroit, Mich.; R. H. Spangler, The Spangler Co., Inc., St. Louis, Mo.; Frank Langsenkamp, Jr., Langsenkamp Co., Indianapolis, Ind.; H. E. Adams, Lewis Supply Co., Memphis, Tenn.

Constitutional Committee: Irving C. Alter, Harry Alter Co., Chicago, Ill.; M. W. Ap-

(Continued on Page 52)

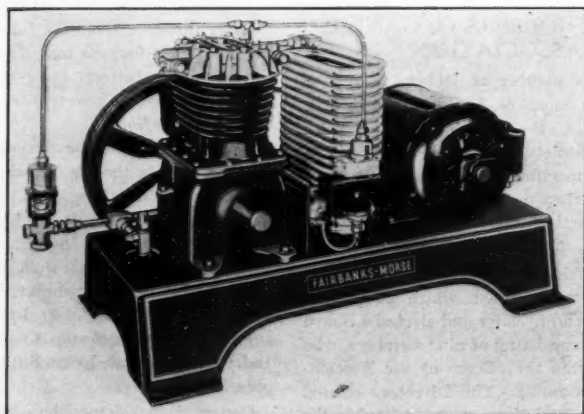
# Lubrication of Air Conditioning Equipment *(Continued from the October issue)*

Further Information on Air Conditioning Lubrication. Methods of Lubrication. Splash and Pressure Lubrication. Ring Oiled Bearings. Piston Ring Installation.

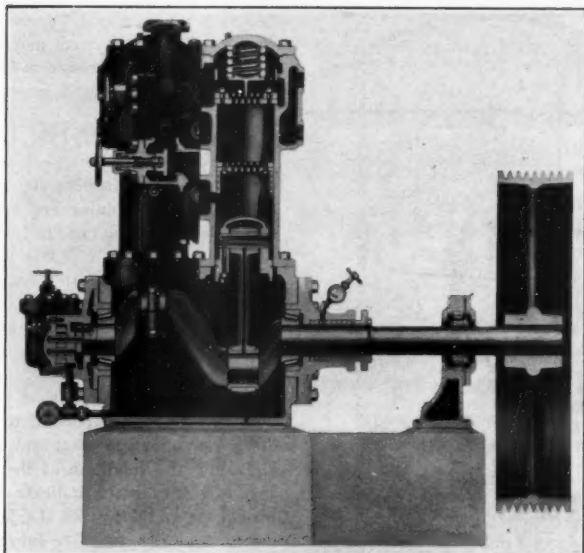
PRIOR to the development of the several highly successful dewaxing processes which are now in general usage, pour test of a petroleum lubricating oil was deemed to be chiefly dependent upon the base of the oil and, to some extent, upon the viscosity. Today, however, the art of dewaxing has been so highly developed as to render pour test more definitely dependent upon the method of refinement, although the derivatives of naphthenic base crudes possess a naturally lower pour test and hence do not require such exacting treatment in the refinery process.

The sequence of operations is of distinct interest. The first step involves segregation of the lubricating fractions of the crude oil by distillation. Refrigerating oil stocks are normally distillates; these stocks are then

subjected to chemical treatment and filtration. Oftentimes they are carried through a dewaxing process whereby the wax content is largely removed by crystallization and mechanical treatment, including further filtration, chilling or centrifuging. The wax content will normally be the controlling factor in regard to pour test or relative fluidity at low temperatures. All petroleum products contain a certain amount of wax. It is more pronounced, however, in crudes of paraffin base than those of naphthene base. Wax is also more difficult to remove from the former. As a result, unless a paraffin base stock has been especially dewaxed, it will show a considerably higher pour test than a naphthenic base oil of the same viscosity.



Courtesy of Fairbanks, Morse & Company  
Fig. 10—The Fairbanks, Morse air conditioning condensing unit, showing compactness of the assembly and relative location of the parts.



Courtesy of Carbondale Machine Corporation

Fig. 11—Sectional view of a Carbondale vertical, two cylinder, Freon compressor. Note in particular use of the tapered roller bearing on the crankshaft, details of lubricating system for automatic and positive circulation of oil, and design of the stuffing box.

The dewaxed oil is finished or given final refinement by redistillation, chemical treatment, solvent extraction or filtration. Any of these processes may be used individually or in various combinations with one another. The ultimate objective, however, is the same in all cases, i.e., to increase the resistance to breakdown, lower the pour test and improve the chemical stability of the oil.

#### Methods of Lubrication

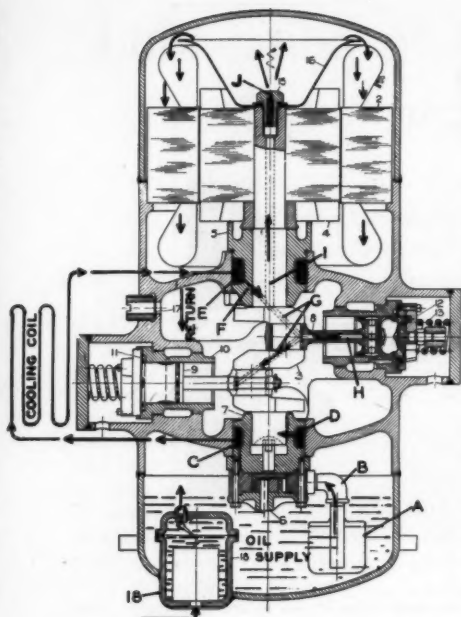
Splash, pressure or circulated lubrication by means of ring oilers, have proved the most adaptable methods of lubricating air-conditioning compressors. Splash oiling is best adapted to the small tonnage, enclosed-type, vertical reciprocating machine. Pressure lubrication, in turn, by means of an enclosed gear pump, an oscillating cylinder reciprocating pump, or, an external force feed lubricator, is applicable to the larger type vertical or horizontal unit; whereas the ring oiler in conjunction with force feed, for sealing purposes, has proved especially adaptable to the bearings of the centrifugal machine.

#### Splash Oiling Systems

In a splash system the oil is distributed at each revolution of the crank, the level in the crankcase being maintained just high enough to permit the crank to dip and splash the necessary amount of oil to the cylinder walls, etc. Continued operation will result in the crankcase being filled with a lubricating vapor above the main body of oil, which will also insure adequate lubrication of main, wrist pin and crank pin bearings.

When re-charging the case with oil, the level must never be raised too high. Otherwise, oil would be churned by the crank, bringing about such violent agitation as oftentimes to preclude effective precipitation of any impurities that may have gained entry. There would also be possibility of loss of lubricant past the piston with subsequent entry of an excess of oil into the condensing and evaporating parts of the system, or increase in the rate of mixture with the refrigerant.

This can be partly overcome by proper



Courtesy of Baldwin-Southwark Corp., De La Vergne Refrigeration Division

Fig. 12—A De La Vergne air conditioning unit. The oil pump, No. 6, takes oil from the oil supply by means of the strainer "A" through suction "B" and discharges into chamber "C."

Part of the oil goes through hole "D" and lubricates the lower end of the crankshaft. From chamber "C" the oil passes through the cooling coil which is mounted outside and comes back to the compressor into chamber "E." From "E" the oil lubricates the shaft through hole "F" and lubricates the connecting rods by the drilled holes "G."

Wrist pin lubrication is taken care of by hole "H" in the connecting rod. The rest of the oil is passed through the shaft hole "I" and through nozzle "J" and splashed over the coils of the stator and from there falls by gravity through slots on the outside diameter of the stator into the lower part of the crankcase indicated as "oil supply" in the drawing.

The oil trap No. 18 is the means of discharging the oil which has collected in the system back into the compressor. Arrows indicate flow of oil.

adjustment of the piston rings. Where the latter are not sufficiently tight, if the crankcase contains too much oil or agitation is too violent, the excess, which naturally will reach the cylinder walls, will tend to work past the rings. This is not only wasteful, but a detriment, for if the oil is not of sufficiently low pour test there will be a possibility also of its congealing within the system, to act as an insulator and reduce re-

frigeration to a marked degree. The presence of oil in the system may also cause a higher condenser pressure by reason of the vapor pressure produced by the oil.

### Excess Oil

Use of excess oil in a splash lubricated system will also involve the possibility of difficulty when draining and cleaning, especially where sludging has taken place. Churning of certain oils in a crankcase will give rise to sludge formation if they have not been very highly refined. In part, this is due to oxidation. It will be most probable where water is present or the oil is laden with foreign matter, such as dirt, metallic particles, or carbon.

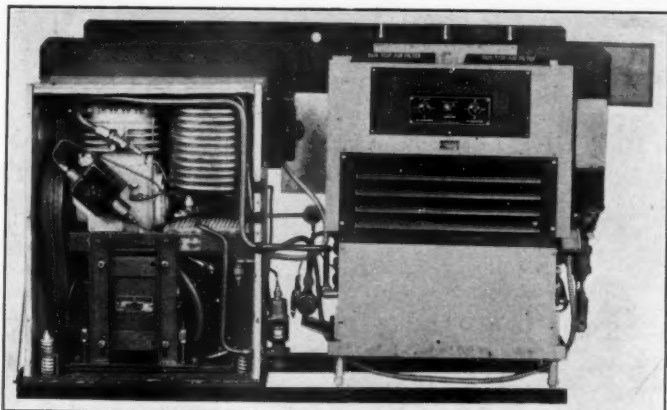
It is, therefore, important to follow regular periods for cleaning, and to look carefully into the condition of the used oil, for this will very often indicate both the approximate suitability of the latter and the extent to which effective lubrication is being attained.

### Pressure Lubrication

With a pressure system, more accurate control of the amount of oil delivered to cylinder walls and compressor bearings is made possible. On the other hand, some types of design may require more equipment, piping, etc., frequent filling of the reservoir where a mechanical force feed lubricator is installed, and regular attention from the operator.

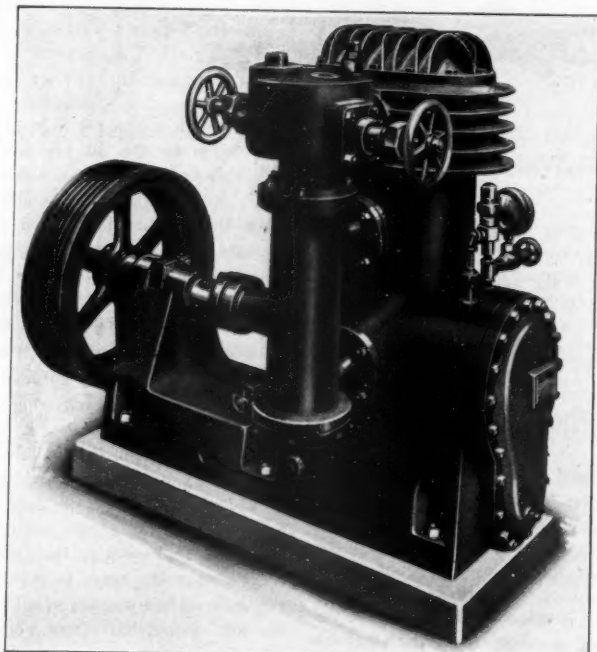
In the central station type of installation, pressure lubrication is especially adapted to cylinder and rod lubrication via the oil lantern or oil recess within the piston rod stuffing box. By properly constructing a stuffing box with a lead to come from the lubricator, it is possible to operate the piston rod continually through a ring of oil. In this way effective rod lubrication, as well as sealing against pressure, can be maintained.

To lubricate the cylinder in addition, it is only necessary to deliver additional oil to the stuffing box lantern and provide a so-called overflow pipe to carry this to the refrigerant suction line adjacent to the cylinder. In effect, this is similar to the principles of steam cylinder lubrication, the



Courtesy of General Electric Company

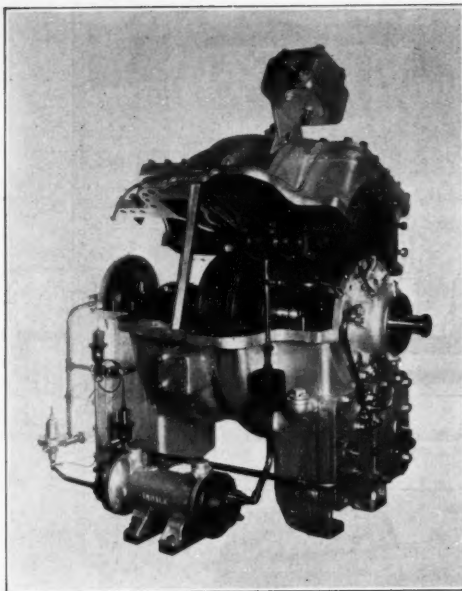
Fig. 13—A G.E.-unit room air conditioner with cover removed to show relative location of the condensing unit and other parts.



Courtesy of Frick Company

Fig. 14—Showing a Frick enclosed-type Freon compressor. A unique feature of this machine is the force feed oil pump which is located in the base of the crankcase and operated by a chain connection from the main shaft. This pump is located at the lowest point in the crankcase and the oil flows to same by gravity.





Courtesy of Carrier Engineering Corporation

Fig. 15—Open view of a Carrier centrifugal refrigerating compressor, showing design of the interior, and essential piping.

refrigerating gas being impregnated with vaporized lubricant prior to its passage through the compressor.

Mechanical force feed lubricators can also be used where compressor cylinders are to be pressure oiled. Excellent economy will be attained by regulating such lubricators so that just enough oil is delivered to maintain the requisite lubricating films, with the least amount of excess to drain off.

#### Enclosed Oil Pump Design

In realization of the necessity for controlled lubrication, certain compressor builders have given some noteworthy study to the application of the enclosed type of force-feed oil pump. One particular design has provision for location of this pump in the base of the crankcase, driving through sprockets by chain connection to the main shaft. By locating the pump also at the lowest part of the case, the possibility of loss of suction is eliminated inasmuch as the oil is continually being returned by gravity.

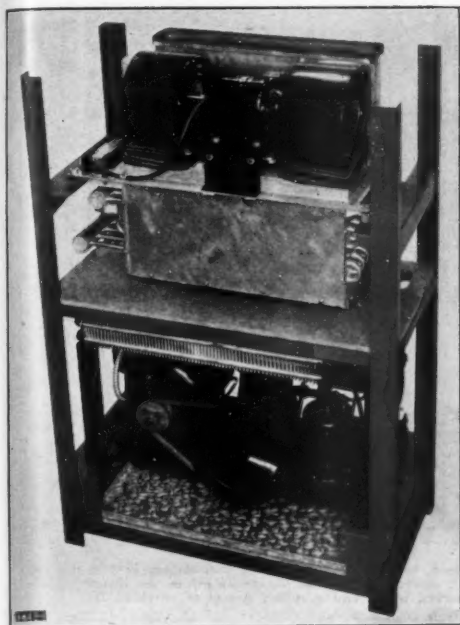
This assures positive delivery of oil to all reciprocating parts through the pipe connections provided for same.

#### Ring-Oiled Bearings

Lubrication by means of the ring oiler is applicable to the outboard bearings of the crankshaft in certain types of heavy duty reciprocating machines and to the rotor bearings of the centrifugal compressor. In connection with the latter, the oil performs a dual function in that it not only lubricates the bearings but also maintains an automatic oil seal against loss of vacuum. This seal at the drive end of the centrifugal compressor is obtained through an automatic mechanism actuated by the oil pressure developed during operation, and by springs when the machine is at rest. The principle of operation, according to Carrier Engineering Corporation—"comprises a rotating and a stationary disc, held in position by the oil pressure and separated from actual wearing contact by a film of oil under pressure.

When the machine is stopped and the oil pressure ceases, compression springs are automatically released and these then effect an equally dependable and leak-proof seal while the machine is inoperative."

As a means of lubrication, the ring oiler is simple, clean, entirely automatic, uniform in oil distribution and requiring of but little attention. In construction it comprises a bearing housing which is built with a reservoir and a slot of sufficient width and depth in which revolve one or more rings suspended from the shaft, according to the length of the bearing; the turning of the shaft causes the rings to rotate. By this action, a certain amount of oil is carried to the top of the shaft from whence it flows into the bearing oil grooves and clearance space to be ultimately distributed over the entire wearing surface. The oil, after passing through the bearing, flows out to the end or ends of the shaft and back to the reser-



Courtesy of Kelvinator Corporation

Fig. 16—A Kelvinator self-contained unit with all panels removed to show interior details and relative location of the fan elements and the condensing unit.

voir to a return chamber which is part of the bearing housing.

A ring-oiled bearing is flood-lubricated with a considerable excess of oil over the amount necessary to furnish the requisite oil film. Bearings designed for this type of lubrication may be said to be doubly protected in that the oil serves not only as a lubricant, but also as a cooling medium to carry away part of the frictional heat developed, thereby reducing the temperature of operation. If the oil reservoir in the base of the bearing has been properly designed and is of sufficient capacity, this overheated oil in turn becomes sufficiently cooled after each circulation to enable it to perform this heat transfer function indefinitely.

Oil splash or churning is objectionable in the centrifugal compressor due to the possibility of impairment of the seal. For this reason, oil which is carried to the top of the bearing on this machine must be returned to

the reservoir as rapidly as it is delivered by the ring in order to avoid undue accumulation in the upper part of the housing. The same condition might arise if the oil is carried too high in the well, or if the ring is too small or rotates too rapidly.

### Piston Ring Installation

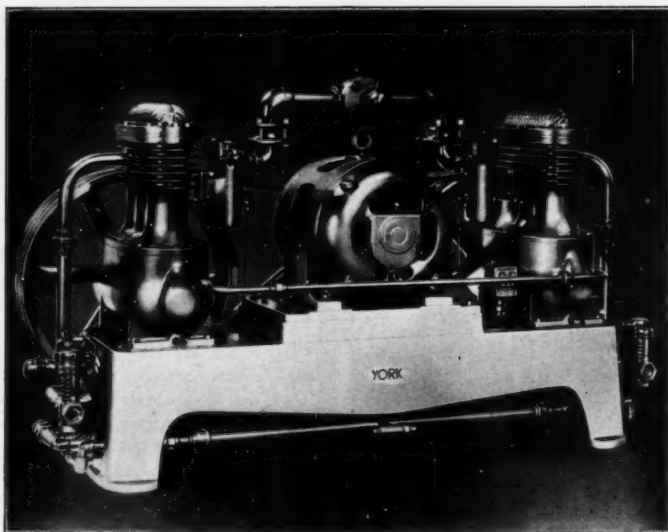
The use of piston rings in the reciprocating type of air-conditioning compressor will be dependent upon the size and design of the machine. Rings are always used in the horizontal compressor; in the smaller unit type of vertical machines, however, piston rings may be eliminated in favor of closer clearance or a tighter fit between the pistons and cylinders. This practice, on the other hand, requires very accurate machine work and thorough knowledge of materials and their susceptibility to wear.

### Ring Design

In the interest of maintenance of a suitable seal, and preventing abnormal passage of lubricating oil from the crankcase into the refrigerating side of the system, some very interesting studies have been made in regard to ring design, materials and installation. It has been indicated that the conventional type of soft iron ring is not always dependable due to the tendency it may have to warp or bend, especially when being installed. Any deformation may, of course, lead to binding or even sticking in the ring grooves. Obviously, this may result in faulty lubrication, an imperfect seal, and passage of a considerable volume of oil over into the refrigerating or heat transfer side of the system to cause reduced efficiency of the entire unit.

### Motor and Fan Bearing Lubrication

Electric motor bearings and the bearings of other accessories such as fans, which are essential to a mechanical air-conditioning system, are largely of the anti-friction type.



Courtesy of York Ice Machinery Corporation

Fig. 17—A York duplex triple Freon condensing unit. This installation is provided with a "Centriforce Oiler" which delivers a constant stream of oil to the thrust bearing. The main bearings are submerged in oil and a splash system is provided for the wrist pin bearings and cylinder walls.

In addition, the ball-bearing hanger has been widely adopted in connection with railroad car air-circulating systems. Lubrication of such bearings should differ but little from the lubrication of the industrial ball or roller bearing motor, with the exception that location in confined spaces might, in some cases, tend to cause higher average bearing temperatures in operation.

The first cost of such bearings may be somewhat higher than the conventional plain bearing. Positive protection to justify this cost is, therefore, essential. Such protection is assured by lubrication provided the proper lubricant is used. Normally, the design will call for a grease, the bearing seals being so designed as to enable such a lubricant to function at its best, apart from contamination from external sources. This will assure easy rolling of the bearing elements, with minimum friction and wear. Rolling motion must be maintained as perfectly as possible, however, for if it is impaired in the case of even but one ball or roller, more or less sliding will occur to the detriment of

the contact surfaces of itself as well as the raceways.

Adequate sealing is highly important on any air-conditioning installation, not only as a protection against contamination, but also in the interest of preventing leakage and necessity for frequent renewal of grease. It is obvious that positive protection of the bearing elements cannot be assured if the lubricant is prematurely lost. Furthermore, leakage, especially in a railroad car installation where the fans and motors may be located overhead in a space above the doors, might readily cause considerable expense and discomfort to passengers should this leakage drip through and onto clothing.

While a tightly sealed bearing will, of course, permit the use of a lighter lubricant, which will lead to reduction in torque and power consumption, the matter of temperature must not be overlooked, for temperature will affect the consistency of any grease. Research in grease manufacture has developed a type of lubricant which is pos-

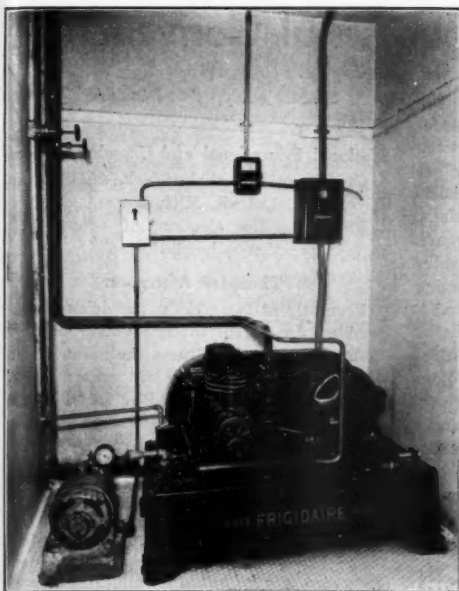
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Courtesy of Frigidaire Corporation

Fig. 18—A Frigidaire hotel installation showing manner of arrangement of piping and controls.

essed of certain highly desirable properties, in that it resists change in consistency and, even at higher temperatures, it will train with the bearing and not work out. Furthermore, it is remarkably low in torque characteristics. From a chemical angle, it is free from acid forming tendencies which assures protection against corrosion, and is resistant to oxidation or expansion through air entrainment. These properties, along with an ability of the lubricant to resist oil separation, should be most carefully considered in the purchase of grease for any ball or roller bearing.

Application or renewal of lubricant is also important. One should never force an excess of grease into any anti-friction bearing housing by either a compression grease cup or pressure gun. The latter must be handled especially carefully due to the potential pressures available. If pressure is not controlled, the charging of too much

grease may affect the tightness of the bearing seal. An excess of grease in the bearing may also lead to overheating as well as increase in power consumption. For these reasons, operators and maintenance mechanics should realize that any ball or roller bearing has a certain limited capacity for lubricants which should not be exceeded. Unfortunately, there is no direct way of determining this; hence, the advisability of removing the bearing caps, and inspecting at overhaul periods. Experience with bearings of various size, and knowledge of the effectiveness of their seals, along with the lubricating ability of certain greases, will soon enable an observant operator to develop a suitable lubrication schedule which will assure bearing protection and economy of lubricant.

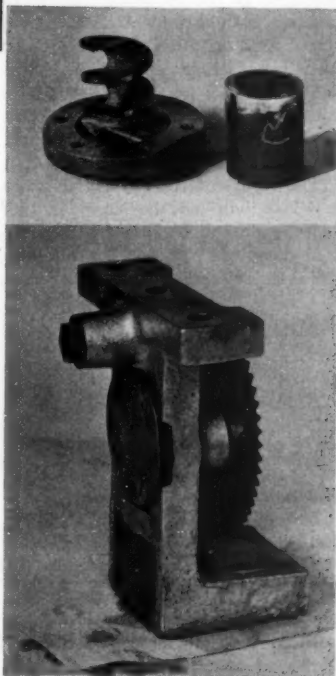


Fig. 19—Showing a Westinghouse oil separator and oil pump. The former extracts oil from the refrigerant by centrifugal and baffle action. A strainer is also built in to prevent possibility of entry of foreign matter. The oil pump is of the automotive type as indicated.

Courtesy of Westinghouse Electric and Manufacturing Company

# R.S.E.S. Holds Successful Convention

(Continued from Page 17)

in the refrigeration industry in their daily competitive struggle for existence. One of the most gratifying results we have noticed in our Chicago Chapter is that men who are indeed competitive have become great friends through their associations at our meetings, and we in Chicago have learned through these friendships that more and greater business can be gotten by generally having faith in these competitors than otherwise."

Following this talk, Mr. T. H. Mabely, of the Air Conditioning Corporation, was introduced and presented his paper on "Air Conditioning for Small Stores and Homes." Mr. Mabely's paper will appear in a subsequent issue of THE REFRIGERATION SERVICE ENGINEER.

## Election of Officers

As the next order of business was the selection of the National Officers for the ensuing year, President Fowler requested the report of the Credentials Committee. Mr. Chas. Eich, in reporting as chairman of the Credentials Committee, stated that the committee had investigated the credentials of the eleven chapters represented and found them all in good order.

The report of the Credentials Committee was accepted, and Mr. Harry D. Busby, of the Nominating Committee, reported for that committee. The election resulted in the following selection of officers for 1936:

## Officers—1936

**PRESIDENT**, James H. Downs, 2552 Blaine Ave., Detroit, Mich.

**FIRST VICE-PRESIDENT**, Paul Jacobsen, 8518 S. Ashland Ave., Chicago, Ill.

**SECOND VICE-PRESIDENT**, W. Hall Moss, P. O. Box 1845, Memphis, Tenn.

**TREASURER**, S. A. Leitner, 8112 Holmes St., Kansas City, Mo.

**SECRETARY**, H. T. McDermott, 483 N. Waller Ave., Chicago, Ill.

**SERGEANT-AT-ARMS**, Claude A. Brunton, 809 32nd St., Huntington, W. Va.

## Board of Directors

**E. A. Plesskott**, 2145 67th St., St. Louis, Mo.

**W. W. Farr**, 1412 Marlowe Ave., Lakewood, Ohio.

**C. O. McCauley**, 405 Penn Ave., Pittsburgh, Pa.

**National Educational and Examining Board**  
**CHAIRMAN**, Geo. H. Clark, 6517 Grand River Ave., Detroit, Mich.

Following the election of officers, the morning session adjourned.

## Thursday Afternoon

Promptly at two o'clock, the delegates assembled for a trip to the Wolverine Tube Company plant to witness the manufacture of tubing, and again this trip proved one of the interesting educational activities of the convention.

## Wednesday Evening

One of the highlights of the entertainment features was the annual banquet in the Crystal Room of the Fort Shelby Hotel. The entertainment at the banquet was provided for by Detroit Chapter.



## THEY CAME FROM MANY POINTS

Front, R. R. Koepsell, Cedar Rapids, Ia.; T. Saathoff and P. K. Crawford, San Antonio, Texas. Rear, A. J. Meinke, Madison, Wisc.; L. R. Stewart, Ft. Lewis, Wash.



**YOUNGSTOWN CHAPTER MEMBERS WERE ACTIVE AT THE CONVENTION.**

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## Third Session—Friday Morning, October 25

THE concluding session of the Second Annual Convention was called to order by the newly-elected President, James H. Downs, who introduced the first speaker on the program, stating, "This morning we would have the privilege of hearing from an 'old friendly service man.' We thought we had him pretty well cornered in Detroit, but when he began to meet the service men from throughout the country, we found that nearly everybody knew our old friend, Frank Riley."

Mr. Riley, in presenting his paper on "Automatic Oil Separators and Commercial Installations," said he had found his voice would not be equal to the task of presenting his paper so that all might hear, and would request one of his engineers, Mr. Owen Nelson, to substitute for him in the reading of this paper.

His paper was prefaced by a humorous treatise based on the events that had transpired during several meetings held simultaneously during the convention. He said that considerable time had been employed in these meetings defining terms, "That is to say, in putting down in some logical form just what is understood or is to be understood as the true picture of the jobber, the dealer, distributor, service engineer, super-distributors, small manufacturer, case goods manufacturer, assembler, ice cream manufacturer and the bootlegger of parts, etc." Continuing, Mr. Riley said, "It seemed to some of us that there were gaps that should be filled up in order not to interrupt the continuity of definitions. For instance, nothing was said about the personnel of the manufacturer of parts, devices and materials, and there were some lapses in describing the activities of the jobber and service engineers," so taking the Herculean task upon himself, he would try to fill some of these voids and begin first at the source of the activities.

### The Parts Manufacturer and His Organization

The general manager of this organization, he thought, should be termed the keystone of the arch, more familiarly referred to as "the old man." "Of course, other names might be applied to him, but it wouldn't be discreet to mention them here. We usually picture him being a well-fed, opulent sort of a guy, living on the fat of the land, but

after all, he is the hardest working man in the whole organization. He works hard, gets nowhere fast, and usually ends up flat as a blown-out tire. Some folks insist that he leads the life of Riley. Then comes the

### Engineering and Research Department

"In most every such department, we have an engineer who is termed 'a refrigerating machine engineer' to differentiate him from the service engineer, and he is said to be a man who knows a great deal about a very little, and frequently twice as little, and he goes along year after year knowing more and more about less and less, until finally he knows practically everything about nothing at all, and then becomes a consulting engineer. Then, we come to the

### Advertising and Sales Departments

"Among the many pearls which hang around the neck of the Boss, there are none that shine brighter and with more luster than the advertising manager. He is hired to find how many ways there are to spend money and he does spend all the jack the purchasing agent overlooks. Now, if the campaign that the advertising manager proposes turns out successfully, he assumes all the credit, and if likewise it turns sour, he undoubtedly will blame the engineers for turning out a mangy lot of junk that never could be merchandised no matter how much money might be spent in ritzy magazines to put the product across.



WISCONSIN MEMBERS WERE RIGHT ON THE JOB.

"Then, we come to the superman of supermen—the salesman. This favorite of the gods arrives on the horizon of industry knowing very little about a great deal, and he likewise keeps on knowing less and less about more and more until he finally knows nothing about everything. Then the

### Purchasing Agent

"He lives in a sphere all his own, and naturally he ranks 'way above the Boss because

he spends all the money that comes trickling in from all sources, and he usually runs the company 'way into the red before the Boss gets next and fires him. He smokes the high-priced cigars, which are passed out by hopeful and trusting vendors. We should not judge him too harshly, but among vendors, he has the reputation of being a tough egg to sell. Now for the

#### Credit Manager

"Here's a specimen that really deserves scientific investigation and possibly vivisection. No one has ever penetrated the frigid atmosphere of his office and come out without frostbitten nose and ears. He is pegged at least one notch lower than the crooner, than which there is nothing whicker. The credit man is the big bad wolf that has always frightened the timid salesmen out of their wits, if any. His entire time and thought in life is to kill, as quickly as possible, all orders turned in by the sales department.



SOME OF THE PITTSBURG MEMBERS TAKE TIME OUT FOR THEIR PHOTO.

#### Service Department

"This is the department where all the work is done; that is to say, this department is supposed to cover up the mistakes which have been made by all other departments, and this is done by writing the irate customer that the man who made the mistake has been fired and from now on and henceforth, there will be no more mistakes and everything will be jake. The service manager is a born diplomat.

#### Shipping Department

"Let's skip it.

#### The Jobber

"Now we come to a great and flourishing group of philanthropists known in the parlance of the street as the 'Jobber.' They exist solely to benefit mankind, and work day and night with never a thought of profit for themselves, striving to find out how they can be most helpful and render service in the highest sense of the word to their trade.

These men come into the world without anything and may leave without anything except the knowledge of work well done and a life well spent in serving others.

#### The Service Engineer

"We arrive at last, but surely not to the least of the cogs in the wheel of industry, the noblest work of the Creator, the service engineer, and don't mistake the service engineer with the engineer mentioned previously. The service engineer is an artist who puts his soul into his work. He is a glorified Boy Scout out to do his good deed each day, and, by heck, he does it. He is a hard working cuss, up at the dawn with an ear cocked for the first service call. At the first clang of the phone, he dashes out to his Rolls-Royce and burns up the pavement to meet the lady who has just phoned that there is something wrong with her machine. She calls it a Frigidaire, but it is an orphan of at least ten summers and many hard winters, and was originally made by the Hot Shot Horse Shoe Company of Al, Ohio.

"After swapping wisecracks with the lady of the house, he squints casually at the unit. This is not at all necessary, of course, but it impresses the lady that he knows quite a bit about everything in general, even if not anything in particular, and she wonders why her husband couldn't learn to be a service engineer, too. To follow the real technique of the situation, the service engineer takes another half slant at the junk pile, and, to make it still more impressive, he hesitates, scratches his head, probably for no good reason except that it itches, but at the same time, it sort of displays an attitude of deep thought and makes a further imprint on the lady. After this short pause, he says, 'Lady, lady—the last man to work on this machine sure did a lousy job. I'm sorry, but you need a new compressor, a new condenser, belt, evaporator, thermostat, some refrigerant, a short piece of tubing and, oh, yes I almost forgot you should have one of the new Riley oil separators. It may not do much good but it won't hurt anything and the company needs the business. The base of the machine can be used, but you should have a new cabinet. I believe we can fix it up with these few parts so that it will run for another year, anyway, and then we can give it a general overhauling. It will cost about \$100.00, but because you got such a bad break last time, I will do the whole job for about \$90.00 and guarantee it.'

So, in concluding this little humorous comparison of the various departments comprising the manufacturers' organization and its relationship to the servicing field, Mr. Riley proceeded with his paper, which is printed in full elsewhere in this issue.

Following this educational talk, the program continued with an interesting moving picture of the manufacture of sulphur dioxide and methyl chloride at the plant of the Virginia Smelting Company, and the various steps in the operation were described by Mr. Chas. W. Johnston of West Norfolk, Va. In explaining the various methods of the manufacture and handling of the refrigerants, Mr. Johnston interspersed his remarks with a dissertation on the chemical formulas and symbols used to designate the various gases.

#### **Moving Picture Shows Manufacture of Sulphur Dioxide and Methyl Chloride**

Following this talk, the next speaker was Mr. E. Barger, service manager of the Universal Cooler Corp. whose talk, "What is Expected of the Independent Service Man," was most interesting and illuminating as to the relationship between the independent and the manufacturer. Mr. Barger in part stated



**CLEVELAND CHAPTER MEMBERS POSE FOR THEIR PHOTOGRAPH.**

that his company was step in step, sees eye to eye, and wants to march shoulder to shoulder with the service man and to extend every cooperation. He further stated, "Unfortunately too much service starts and begins with conversation. It is so easy to sell, but it is never possible to over serve. Elbert Hubbard once said, 'That man is rich only as he serves.' So, if you want to know how to serve the manufacturer best, forget the manufacturer and forget yourselves. Just dedicate yourselves to the task of serving your customer, and if he is served properly, you will instinctively and automatically serve

the manufacturer as he should be served, and you yourself will reap the benefit of that type of service."

Following Mr. Barger's talk, the reports of the various convention committees were called for, and Mr. Harry Drownes, reporting for the Auditing Committee, reported as follows:

#### **Report of Auditing Committee**

"Mr. President and members: The Auditing Committee has reviewed the books and found the books adequately kept; also, found supporting data for every expenditure existing. We examined the bank account, and we found that the bank account had all the money accounted for as showing in the books. I really want to mention at this time that we owe a vote of thanks for the manner in which the books have been kept at no expense to ourselves."

#### **Report of Grievance Committee**

Mr. W. H. Moss, reporting for the Grievance Committee, stated, "I am very happy to state that no one has made any grievance complaint to this committee. I hope at all future dates of our conventions it may be the same."

#### **Report of Resolutions Committee**

The report of the Resolutions Committee, presented by Mr. Claude A. Brunton, chairman, was as follows:

*To the Officers and Members of the Refrigeration Service Engineers' Society:*

Your Resolutions Committee is pleased to submit for the consideration of this convention, the following Resolutions:

**BE IT RESOLVED**, That the Associated Adjusters of America, Inc., located at 188 W. Randolph St., Chicago, be and are hereby endorsed and recommended as the official counselors for the Refrigeration Service Engineers' Society, for the purpose of creating an official collection, service and credit bureau, and to further act as official adviser in all legal matters pertaining to the industry, and it is further resolved that a committee be appointed to work in harmony with H. P. Scher of the Associated Adjusters of America, Inc.



GROUP PICTURE SHOWING PART OF ATTENDANCE AT EXHIBITORS EROLIC R.S.E.S. CONVENTION, WEDNESDAY EVENING, OCTOBER 23, 1935, AT FORT SHELBY HOTEL, DETROIT, MICH.

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**BE IT RESOLVED**, That thanks be extended to the retiring officers and other members of the Society, and especially the General Convention and Program Committees, for their cooperation for the success of the 1935 Convention.

**BE IT RESOLVED**, That the Society extend its appreciation to the parts distributors and manufacturers for their cooperation at the 1935 Convention of the Refrigeration Service Engineers' Society.

**BE IT RESOLVED**, That this Convention go on record as strongly urging the Cost Accounting Committee to continue active work in proposing a uniform cost accounting system suitable to the requirements of the membership of this Association.

**BE IT RESOLVED**, That a vote of thanks be extended to the Fort Shelby Hotel management for their cooperation at this 1935 Convention.

**BE IT RESOLVED**, That the Board of Directors appoint a committee to follow through and complete symbols for the refrigeration industry as suggested by Mr. J. Askin of the Fedders Manufacturing Co., and to add to such changes as suggested by approved sources.

RESPECTFULLY SUBMITTED,

Claude A. Brunton

S. A. Leitner

E. J. Merenda

Resolutions Committee

The resolutions were presented individually to the convention and unanimously passed by the assembled delegates.

At this time, Mr. Leland R. Stewart, of Fort Lewis, Washington, was introduced as having the distinction of traveling the longest distance to attend the convention.

#### Selection of Convention City

The next procedure of business was the invitation for the holding of the 1936 Annual Convention. This proved quite a spirited contest, with Memphis, Tenn. and Chicago, Ill. as the leading contenders for the convention city. During the three days of the convention, the delegates from both of these cities were quite active in their friendly campaign in outlining the facilities and reasons for bringing the convention to their respective cities. While it was announced

from the chair that a vote would be taken on the next convention city, it was to be understood that this vote was to show the preference of the delegates assembled, and the final decision, as provided by the Constitution and By-Laws, would be up to the Board of Directors.

Mr. W. H. Moss, as spokesman for the active Memphis delegation, placed his city in nomination.

Following Mr. Moss, Mr. Paul Jacobsen invited, on behalf of the Chicago Chapter members, the convention to Chicago.

Following this procedure of business, several constructive suggestions were made from the floor for the future activities of the Society.



THE LADIES WERE PROMINENT. SOME OF THE WIVES OF THE CHICAGO MEMBERS.

Mr. Harry Drownes, speaking as the elected delegate of Chicago Chapter, proposed an amendment to the by-laws of the organization, to eliminate Section 2 from Article 10 of the National By-Laws. This amendment will be acted upon at the 1936 convention.

Further amendment to the by-laws was suggested as follows: that the Refrigeration Service Engineers' Society will not recognize, endorse or sponsor any outside organization.

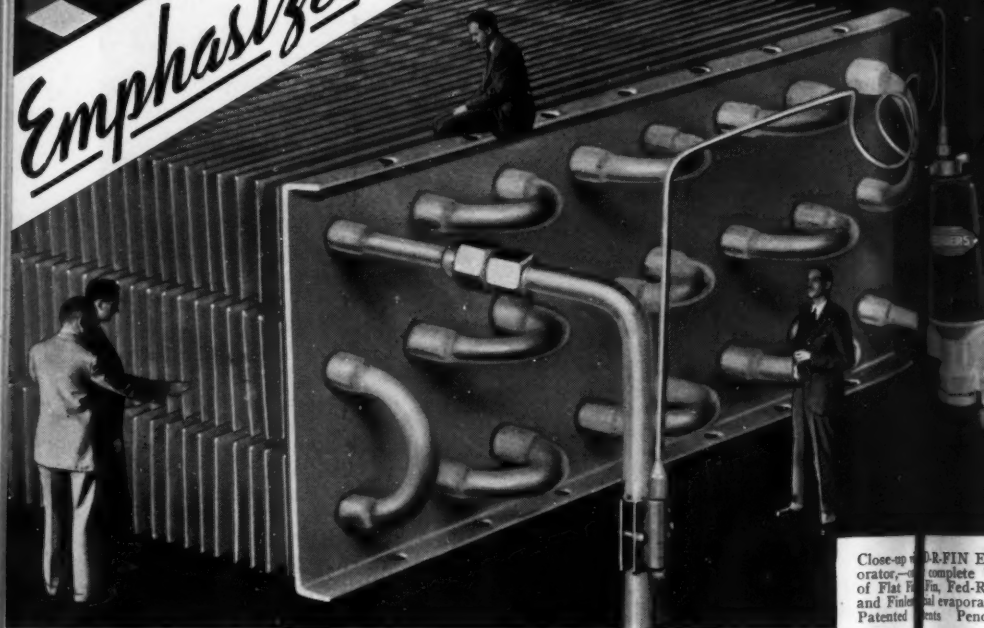
#### Memphis to be 1936 Convention City

At the meeting of the Board of Directors, formal action was taken upon the selection of the convention city and Memphis was selected. It was also definitely determined that the convention dates for the Third Annual Convention would be set for some time in the middle of November—announcement to be made later.



# FEDDERS

*Emphasizes these important things to look for*



Close-up of the complete of Flat Plate and Finned and Finned Patented

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FEDDERS  
NEWS**

**FEDDERS MANUFACTURING CO.  
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Buffalo, N. Y.**

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# when buying Refrigeration Units

## ALL COPPER CONSTRUCTION

Copper fins in metal-to-metal contact with copper tubes provide the maximum heat transfer efficiency that only copper can give.

## COMPLETE LOW SIDES

Fedders evaporators and valves give you a COMPLETE LOW SIDE synchronized in performance and quality,—and available from a single source.

## COMPLETE LINE INCREASES SALES

Every prospect is YOUR PROSPECT when you standardize on Fedders COMPLETE LINE. It is a selling asset that helps you fill ALL of your customers needs with the most effective and economical units.

## QUICK DELIVERY ALL OVER THE MAP

When your customers want it "yesterday" you get quick delivery from the Fedders factory, factory branches and distributors located all over the map. You will enjoy doing business with Fedders.

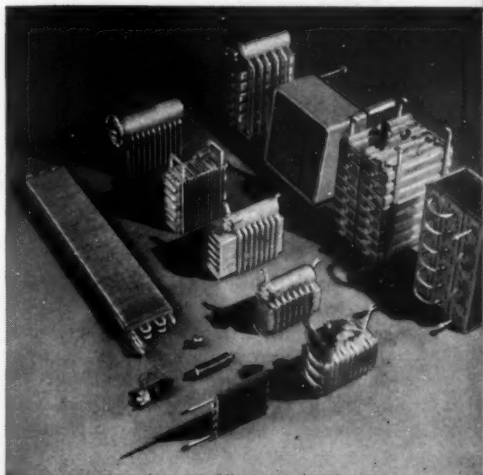
*Patented  
and Pats. Pending*

## THOROUGH CLEANING AND DEHYDRATING

One of the hidden values of Fedders products is their thorough cleaning and dehydrating to protect the system, your profits and your reputation.

## 10 YEARS' REFRIGERATION EXPERIENCE

A ten year record of actual field performance stands behind Fedders products and Fedders customers. Fine products have built a fine reputation. It takes quality engineering to build quality products and a quality reputation.



Close-up of a Flat Plate Fin, Fed-R-Fin and Finned Tube evaporators. Patented Pats. Pending.

# FEDDERS

## MANUFACTURING COMPANY

57 Tonawanda Street

Buffalo, N. Y.

## The REFRIGERATION SERVICE ENGINEER

A Monthly Illustrated Journal, Devoted to the Interests of the Engineer Servicing Refrigeration Units, Oil Burners and other Household Equipment.

Vol. 3 November, 1935 No. 11

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### Official Organ

### REFRIGERATION SERVICE ENGINEERS' SOCIETY

## THE ANNUAL CONVENTION

CONVENTIONS are barometers of the progress being made in industry. They afford an opportunity of an annual check-up—an inventory of the industry's activity, its failings, changing trends, etc. They are a sales stimulus—an annual conference of leaders in their respective fields, willing to contribute their time and counsel, knowing well that such an investment will provide definite returns for themselves in acquiring a knowledge of their business that cannot be purchased elsewhere.

The importance of the recent convention of the Refrigeration Service Engineers' Society, in Detroit, cannot be over-estimated. The constructive work that the organization has accomplished received its due recognition. The program, which the Society has dedicated itself to carry out for its activity during the coming year, received commendable endorsement from all sources identified in the refrigeration industry.

Further, the meeting was directly or indirectly responsible for the formation of two other organizations—the jobbers and the manufacturers—who, recognizing that the continued growth of this business has brought about problems that require coop-

erative study and action, took the initiative in forming associations to decide on problems for the benefit of the entire field.

With all such organizations working toward a common objective, the betterment of business conditions, as they affect each refrigeration group, can only result in the continued advancement of the business in its entirety.

\*\*\*

## KNOW THY COSTS

CERTAIN fundamental principles are responsible for business success. These principles are as unchangeable as the laws of nature. Business is only successful as it profits the individual in securing for him a fair return for his labors.

One of the undeniable weaknesses that is evident in the service business (and from which profit can only be figured) is a lack of knowledge of the true costs of conducting business. No matter how small the business may be, a simple system, applicable to the requirements of that business, should be adopted. Read E. A. Seibert's article on this subject on page 24.

\*\*\*

## ST. LOUIS CHAPTER DISPLAYS ATTRACTIVE BANNER

ST. LOUIS CHAPTER lays claim to having the largest representation of members present at the convention, based on its paid-up membership. The chapter was identified by an attractive banner, 42 inches long and 18 inches wide, in blue and white, the city's official colors.



Mr. E. A. Plesskott, the efficient secretary of St. Louis Chapter and member of the Board of Directors of the National Society, is responsible for the design of the banner.

In addition to the insignia of the Society, it displays the embroidered emblem of the city of St. Louis. Mr. Plesskott has offered to assist other chapters in having their banners designed from the original copy prepared for St. Louis, at the actual cost of the manufacture of the banner. The banner should display the colors and insignia of the individual city.

## CARL SCHNEIDER CO.

Complete Stock

### REFRIGERATION PARTS SUPPLIES & ACCESSORIES

"Fastest Growing Parts Company  
Serving the Middle and Southwest"

Competitive Prices

2210  
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### Refrigeration Specialties

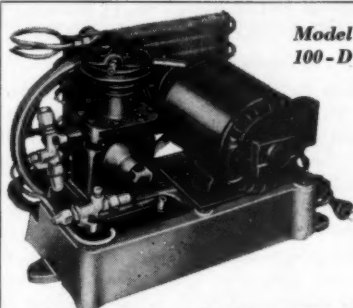
"With Estimating Service for Service Engineers"

Replacement Parts for All Makes—  
Belts—Tubing—Fittings—Tools  
Refrigerants—Valves—Controls  
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### Servicemen Supply Company

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### COMMERCIAL COMPRESSORS

Up to 10 H. P.

48 styles and types of  
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Write for data sheets and catalogs

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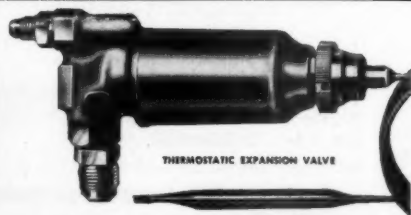
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## STANDARD REFRIGERATING APPLIANCES

Designed and Built for—

## DEPENDABLE SERVICE



THERMOSTATIC EXPANSION VALVE



OIL SEPARATOR  
WITH AUTOMATIC  
OIL RETURN



AUTOMATIC SUC-  
TION PRESSURE  
THROTTLING  
VALVE

Here are a few outstanding members of the Blue Ribbon Products line. They have already achieved an outstanding reputation for dependability—fully in keeping with the leadership which American Injector Company has maintained in its own sphere of work. American Injector Company also offers refrigerating type fittings, refrigerating valves, liquid line filters, dehydrators, acid neutralizers, standard parts and materials, service tools, shaft seals, bearing metal and parts.

Descriptive literature will be gladly furnished on any or all of these lines on request.

### AMERICAN INJECTOR CO.

1481-14th St.

Detroit, Michigan

BLUE RIBBON PRODUCTS

## PARTS MANUFACTURERS ORGANIZE ASSOCIATION

(Continued from Page 26)

Larkin Refrigerating Corp., Atlanta, Ga.; F. B. Riley, American Injector Co., Detroit, Mich.; K. B. Thorndike, Detroit Lubricator Co., Detroit, Mich.; F. O. Webster, Cutler-Hammer, Inc., Milwaukee, Wis.; Morrill Dunn, McCord Radiator & Mfg. Co., Detroit, Mich.

The principal discussion at this first meeting was similar to the discussion of the parts manufacturers, as to the definition of a jobber. The following definition was accepted by the manufacturers assembled, and subsequently tentatively accepted by the jobbers at one of the meetings which they held:

"The definition of a refrigeration supplies jobber or wholesaler hereinafter defined does not include the type of distributor who is recognized by some manufacturers as national or territorial sales-agents. It is recommended, however, that these so-called sales-agents restrict their sales at wholesale prices to those concerns who conform to the following definition of a refrigeration supplies jobber.

"In the following definition, the term 'trade' is defined as including the following:

- "1. Refrigeration Serviceman.
- "2. Refrigeration Dealer.
- "3. Refrigeration Distributor.
- "4. Refrigeration Wholesaler.
- "5. Refrigeration Contractor.
- "6. Ice Cream Manufacturer.

"The term 'Refrigeration Supplies Jobber' is defined to mean anyone performing the following functions hereinafter mentioned, and who does no retail service work for consumers, but may do service work for the trade on a wholesale basis. Provided, however, such jobber does not perform such wholesale functions merely to secure wholesale prices for the benefit of allied persons, firms, or corporations.

"A jobber should perform the following functions:

"1. Purchase at wholesale prices at least five different essential products necessary to supply adequately the requirements of the trade.

"2. Maintain and warehouse a stock of such products to supply adequately the requirements of the trade.

"3. Distribute to the trade only a catalog, either of his own or an aggregation of his manufacturers' catalogs. In case of a catalog of his own, the manufacturer should have the privilege of editing those pages or parts of pages covering his particular products."

§ § §

## SUPPLY JOBBERS ORGANIZE ASSOCIATION

(Continued from Page 33)

plebee, Burstein-Applebee Co., Kansas City, Mo.; R. E. Thompson, R. E. Thompson Co., St. Louis, Mo.

Finance Committee: Herman Goldberg, Standard Refrigeration Parts Co., Chicago, Ill.; W. H. Parker, Home Appliance Service Co., Greensboro, N. C.; D. C. Lingo, D. C. Lingo Co., Houston, Tex.

Committee to Contact Manufacturers: H. S. McCloud, Williams & Co., Pittsburgh, Pa.; J. M. Oberc, J. M. Oberc, Inc., Detroit, Mich.; George Monjian, George Monjian Co., Chicago, Ill.

§ § §

## FROM THE PRESIDENT OF THE JOBBERS ASSOCIATION

NATIONAL REFRIGERATION SUPPLIES  
WHOLESALE ASSOCIATION  
901 PENNA. AVE.  
N. S., PITTSBURGH, PENNA.

November 2, 1935.

Refrigeration Service Engineers' Society,  
433 North Waller Ave.,  
Chicago, Illinois.

Att.: Mr. H. T. McDermott, Nat'l Sec'y.

Dear Mr. McDermott:

It gives me genuine pleasure to extend sincere appreciation to you personally, and to the officers and members of the Refrigeration Service Engineers' Society, for the opportunity occasioned by your second national convention, to assemble together, a majority of the Refrigeration Supply Jobbers of the country. As you are aware, of course, this assembly brought into being a National Wholesalers Association.

We are hopeful that through this Association, a closer cooperation and understanding





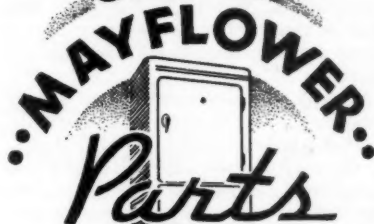
**BIG 1936  
WHOLESALE CATALOG  
FREE**

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SERVICEMEN—  
DEALERS—**

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may exist between the various members of both organizations.

The problems of both organizations are closely allied. We can be helpful to each other in many ways, and together help to create a more stable healthy business for the future.

A number of our members are already members of your Society; others will undoubtedly become members of your Society in the near future; and still others, who though they may not join your Society, will work hand in hand with you for the common good of the industry.

The Detroit Convention was undoubtedly a great success. Those of you who directed the preliminary work and conducted the program, are to be congratulated for the thorough job which you did, and without doubt, everyone attending the convention left Detroit satisfied that their time was well spent.

Our Association hopes to be able to hold their annual meeting each year with your Society. We are looking forward to meeting you all in Memphis, which we understand to be the city decided upon as the scene of the 3rd Annual Convention. In the meantime, let us all pull together; our interests are mutual and our aims are parallel.

We wish each of you as individuals, and as a Society, continued progress and success in the years to come.

Very sincerely yours,

NATIONAL REFRIGERATION SUPPLIES  
WHOLESALE ASSOCIATION.

H. S. McCloud, *President.*

§ § §

## CHICAGO CHAPTER CHATTER

By HERMAN GOLDBERG

**H**OWDY. Howdy. Howdy.

Our entire gang from Chicago got back from that wonderful convention in Detroit, and with the exception of our national vice-president, Paul Jacobsen, came through unscathed. Seems that some fellow came down the road on Paul's side of the street and was thrown for a loss down a ditch. That fellow should have known better. Imagine trying to push Paul Jacobsen around. However, nobody hurt to speak of with the exception that that new Plymouth doesn't look so good any more.

Oh yes. George Frank, the fellow with the big smile in the Imperial group at the convention not only did a good job for himself and his company at the show but when he got back to Chicago immediately went to the hospital for an emergency case of appendicitis. George is doing well now, thank you, but do you know of anybody who wants a good set of appendix, slightly used?

That convention of ours keeps on running through my mind. From what the people who really should know say, it looks like the outstanding convention of the year in the refrigeration industry. As a matter of fact, I believe it was the first time so many people covering the various activities in the industry met at the same place and for the same purpose. Maybe that accounts for a lot of the pleasantness and good feeling that showed itself at all times during the entire convention. Personally, I stayed over a couple of days and even so I believe some of the other boys hung over after I left. It appears that some hang-overs are better than others.

At any rate, from now until next year it is "ON TO MEMPHIS—The City of Southern Hospitality," and boys and girls, I have an idea that as fine as the convention was in Detroit those fellows down in Memphis are really going to show us something.

As chairman of your entertainment committee, I am very happy to announce that during the first week in December we are going to have our past president night, at which all Chicago members are expected to bring their wives, sweethearts, or what have you, as well as to invite other people in the refrigeration industry in Chicago and their wives, etc. The affair is going to be free and we are going to have good entertainment and music, but it will be limited to only people connected with the refrigeration business, and the time and exact location will be announced to you by our secretary, Harry Busby.

Space limits the recording of the scandal which I gathered during the convention, but I will let this out from time to time. If you can think of anything funnier than funny, let me have it. The address is 5101 W. Madison St. or phone my office, Austin 6343.

§ § §

## The NEW Karlberg TWIN Discharge Valve



*Can be used on any make compressor*

The sturdiness and simple construction of this twin valve make it especially easy for the service man to install. Saves time too—no lapping or fitting—the valve is self reseating. Peps up performance—the compressor works more efficiently because the revolving discs seat perfectly smooth—no grooves are worn as frequently happens in older type discharge valves.

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of latest developments in automatic valves. Our engineers have developed several new numbers which anticipate your 1936 requirements.

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## LADIES' ENTERTAINMENT

ONE of the outstanding successes of the convention was the entertainment provided the visiting ladies from out of town, who participated in the entertainment features of the convention.

Under the capable direction of Mrs. Joseph Oberc, chairlady of the Ladies' Entertainment Committee, who was assisted by the following committee: Mesdames G. C. Murphree, J. E. Perry, W. H. Corsan, E. C. McKerracher, P. Mercer and Schultz, the ladies visited Greenfield Village, the historical reconstructed village built by Henry Ford, attended a bridge party, and enjoyed themselves at the Exhibitors' Frolic and the Annual Banquet of the Society.

The success of the entertainment provided by the Detroit Ladies' Convention Committee will undoubtedly influence a larger attendance of the members' wives to attend the 1936 convention in Memphis.

\*\*\*

## APPRECIATION OF CONVENTION

ROTARY SEAL COMPANY  
809 W. Madison Street  
Chicago, Ill.

November 7, 1935.

Mr. H. T. McDermott  
c/o THE REFRIGERATION SERVICE ENGINEER  
433 N. Waller Ave.  
Chicago, Ill.

My dear Mr. McDermott:

Ever since my return from the convention of the Refrigeration Service Engineer's Society held in Detroit, I have been intending to write to congratulate you on the wonderful success of that convention, for I can assure you that I feel this success and the subsequent organizing of the jobbers' association was due almost entirely to the efforts of your Society.

The personal interest you manifested from the start in the interests of the service men and the welfare of their society was very noticeable and particularly pleasing to all who attended the convention.

Our display exhibit has paid us remarkable returns and has secured for us, so far, many new jobbing outlets, with each day bringing in additional inquiries.

I also want to take this opportunity to inform you that an analysis of our advertising for the ten months of this year has proven to us that your publication **THE REFRIGERATION SERVICE ENGINEER** is by far the best medium for getting the greatest results.

With the very kindest personal regards, I remain

Yours very sincerely,

GEO. P. GLMAN, President.

ROTARY SEAL COMPANY.

\*\*\*

## ST. LOUIS CHAPTER

Meeting of October 31, 1935

By E. A. PLESSKOTT, Secretary

SINCE the meeting had been called for the express purpose of getting a detailed report from the men who had attended the 2nd National Convention, President Gray called upon Messrs. Ward, Krueger, Petri, Myers and Plesskott to give a complete description of its various activities. The report was full and interesting, and in the event any details were overlooked, no doubt our next **REFRIGERATION SERVICE ENGINEER** will be able to fill the breach.

A new member, Mr. J. H. Spence, service manager for the local Westinghouse distributor, was introduced and expressed his pleasure at being able to get acquainted with the service men in this vicinity, and promised to give us in the near future an evening of his time and address us on problems pertaining to the servicing of the Westinghouse hermetically sealed unit.

President Gray advised those present that he will leave no stone unturned in his effort to get the convention for 1937, and that an early start and long steady pull with the proper cooperation of our own membership will no doubt result in victory.

Secretary Plesskott reported that on the basis of actual members in good standing, St. Louis Chapter had the largest delegation at the convention, as about 50 per cent of our membership attended, and the consensus of opinion of those who were there was that it was a most successful one.

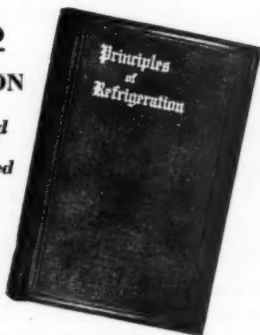
A discussion of the proposed ordinance for the bonding and licensing of refrigeration

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IN ONE VOLUME**

**PRINCIPLES of  
REFRIGERATION**

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EDITION**

**Revised  
and  
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The work is in everyday language, and as free as possible from higher mathematics. The method of treatment has been to present a comprehensive treatise on the fundamental principles. With a firm grounding of these fundamental principles, the practitioner is enabled to intelligently design or operate refrigerating machinery. The theoretical and fundamental operating principles are given attention first. This is followed by numerous practical considerations and the application of the fundamental principles to the economic production of ice and refrigeration for various purposes.

The author has drawn extensively on his wide experience as a refrigeration engineer and teacher of refrigeration engineering, for materials for this work.

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contractors and service men brought out the fact that when this proposition was whipped into shape, our organization would be able to propose a committee who, together with such other committees from allied bodies, would draw up the final draft and have it presented at the next legislature for its consideration.

\*\*\*

## DETROIT CHAPTER

Meeting of November 6, 1935

By J. E. PERRY, Secretary

**T**HE regular meeting of Detroit Chapter was held Wednesday evening at the United Motors Building, November 6 at 8:30 P. M. The meeting was called to order by President Downs. As a new innovation Secretary Perry held roll call, at which twenty-five paid up members were present, with sixteen visitors.

Mr. Phil. Neudeck gave a report on the progress being made with the various City Departments on the licensing and bonding of all contractors. As is usual in affairs of this nature the greatest opposition to anything that is going to benefit the great majority of independent service men, came from men *not* connected with any service organization. After much discussion the various points were all agreed on.

Mr. J. E. Perry next gave a talk on giving this Society back to the independent service man. Mr. Perry made a formal resolution that we add a Section 3 to Article V of our By-Laws, as follows: Associate members will have no vote in the election of officers, or questions pertaining to the welfare or policies of this association.

After lengthy and heated discussions, order was obtained and a vote was taken to see if we would place a notice of this amendment in the mail along with our regular meeting notice, so, on December 4 a formal vote can be taken. The motion carried.

President Downs then resigned, thanking the boys for their cooperation during the past year, and promising them his continued support. His last act as retiring President of Detroit Chapter was to appoint an auditing committee consisting of Mr. Geo. Racklyeft and Mr. W. Corsan to straighten out the financial affairs of the convention.

Mr. Perry then read a letter of thanks from Mr. Paul Jacobsen telling the boys of the swell time he had at the convention and promising the boys the support of the National Officers.

We had another letter from Mr. Herman P. Scher of The Associated Adjusters of America, which was read. The consensus of opinion of Detroit Chapter is that our credit situation is strictly a local problem and must be handled accordingly.

Lo and behold, the Red Wing was passed up for another—you must come up sometime.

\*\*\*

## NEW YORK CHAPTER

Meeting of November 1, 1935

By HAROLD HERKIMER, Secretary

**M**EETING was called to order by Vice-president John A. Rohrer, in the absence of President Busse.

A roll call of officers was taken by J. W. Check, Sergeant-at-Arms, and minutes of the previous meeting were read by Secretary, Harold H. Herkimer.

A discussion on the plans for obtaining a larger membership for the New York chapter was held, and the first steps taken for a large social gathering to be held shortly.

The business session of the meeting was then closed.

The first of the 1935-1936 educational programs for this chapter got under way in a form of a talk by Mr. Joseph Askin, Chief Engineer, of the Fedders Manufacturing Company, Buffalo, New York, who gave a very interesting talk on the automatic expansion valve, thermostatic expansion valve, low side float, snap action valve, constant pressure valve, check valve, unit coolers, etc. The talk was accompanied by slides furnished by the Fedders Mfg. Co.

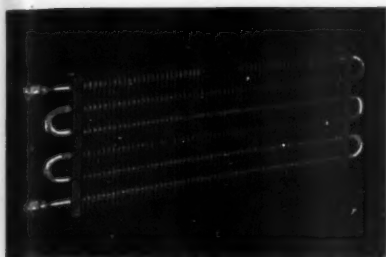
An interested group of approximately 75 men were present, who received catalogs on Fedders appliances.

The meeting was then adjourned for entertainment and refreshments.

\*\*\*

WALTER RENE,  
Missouri.

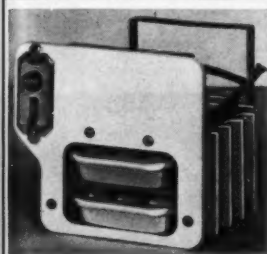
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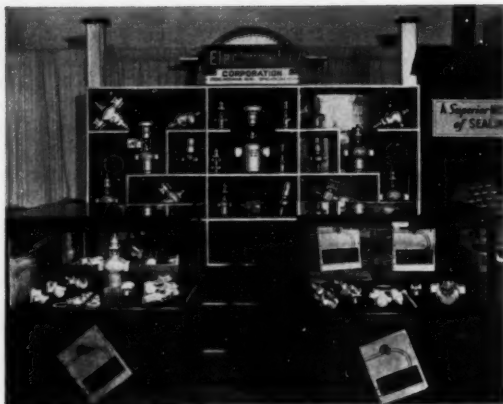
Following the spare time home study that gives the principles of refrigeration and their practical application to ALL TYPES of equipment, U. E. I. men get two weeks (88 hours) of actual servicing and installing experience on all types of household and commercial refrigerating equipment.

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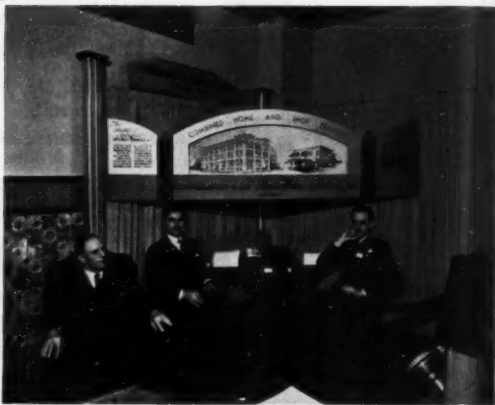


diversified refrigeration appliances on display.

Featured among the twenty-eight exhibits was that of the Frigidaire Corporation, which displayed a group of replacement parts for Frigidaire equipment. The exhibit showed genuine parts available, which are sold to qualified service men through the present distribution organization of Frigidaire distributors and authorized dealers.

### Manufacturers' Exhibit Important Feature of Convention

FROM an educational standpoint, the exhibits of leading manufacturers proved an important feature of the Second R.S.E.S. Convention. Every manufacturer had arranged their exhibit in a most attractive manner, and the delegates had ample opportunity to visit the exhibits and examine the



The companies exhibiting at this convention were:

Refrigeration & Air Conditioning Institute, Chicago, Ill.

Electrimatic Corp., Chicago, Ill.

Rotary Seal Co., Chicago, Ill.

Utilities Engineering Institute and Airo Supply Co., Chicago, Ill.

Automatic Products Co., Milwaukee, Wisc.

George Monjian Co., Chicago, Ill.

(Continued on Page 62)



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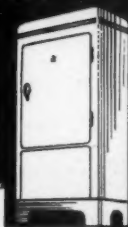
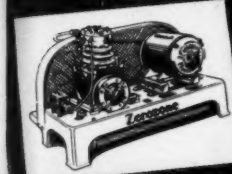
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Send me the literature I have checked. I am interested in receiving any additional literature on Electrical Refrigeration you may issue from time to time.

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Name .....

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**Standard Refrigeration Parts Co., Chicago, Ill.**

**American Injector Co., Detroit, Mich.**

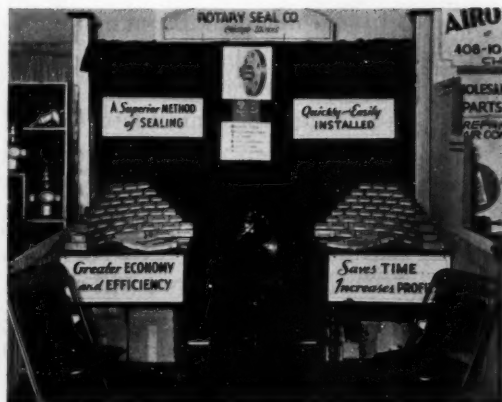
**Wolverine Tube Co., Detroit, Mich.**

**The Starr Co., Richmond, Ind.**

**Fedders Manufacturing Co., Buffalo, N. Y.**

**Detroit Lubricator Co., Detroit, Mich.**

**Virginia Smelting Co., Boston, Mass.**



**Alco Valve Co., St. Louis, Mo.**

**Automatic Reclosing Circuit Breaker Co., Columbus, Ohio**

**Kerotest Manufacturing Co., Pittsburgh, Pa.**

**Ansul Chemical Co., Marinette, Wisc.**

**Henry Valve Co., Chicago, Ill.**

**Copeland Refrigeration Corp., Detroit, Mich.**

**McCord Radiator & Mfg. Co., Detroit, Mich.**

**Imperial Brass Manufacturing Co., Chicago, Ill.**

**Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.**

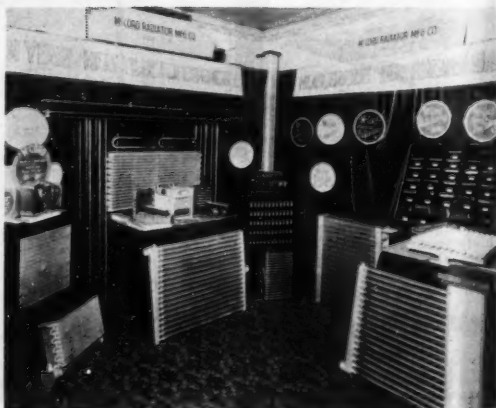
**Dole Refrigerating Co., Chicago, Ill.**

**Frigidaire Corp., Dayton, Ohio.**

**Trico Compressor Service, Chicago, Ill.**

**Mueller Brass Co., Port Huron, Mich.**

**Cutler-Hammer, Inc., Milwaukee, Wisconsin.**





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- ☐ Flin
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- ☐ Compressors

#### Condensers

- ☐ Air Cooled
- ☐ Water Cooled

- ☐ Condenser Water Regulators
- ☐ Connecting Rods

#### Controls

- ☐ Cold
- ☐ Humidity
- ☐ Liquid Level
- ☐ Pressure
- ☐ Temperature
- ☐ Thermostatic
- ☐ Water

- ☐ Domestic Evaporators

#### Dehydrants

- ☐ Activated Alumina
- ☐ Calcium Chloride

#### Dehydrators

- ☐ Door Seals (see Gaskets)
- ☐ Drums, Service
- ☐ Dryers

#### Evaporators

- ☐ Dry
- ☐ Flooded
- ☐ Fan and Pulley Assemblies

#### Filters (see Strainers)

- ☐ Float, High Side
- ☐ Float Valve Seats

#### Fittings

- ☐ Flared
- ☐ Streamline

#### Gaskets

- ☐ Compressor
- ☐ Door
- ☐ Gasket Material
- ☐ Gasket Tackers
- ☐ Goggles
- ☐ Gauges, Service
- ☐ Hardware, Refrigerator
- ☐ Leak Detectors
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- ☐ Liquid Indicator
- ☐ Lubricating Oil
- ☐ Low Side Float Switches
- ☐ Low water
- ☐ Motors
- ☐ Needle, Float Valve
- ☐ Oil Return

#### Packing

- ☐ Fabric
- ☐ Metallic
- ☐ Piston Pins
- ☐ Piston Rings
- ☐ Porcelain Refrigerator Cement
- ☐ Pumps, Circulating
- ☐ Receivers

#### Recording Instruments

- ☐ Humidity
- ☐ Running Time
- ☐ Temperature

#### Refrigerants

- ☐ Sulphur Dioxide
- ☐ Methyl Chloride
- ☐ Carrene
- ☐ Freon
- ☐ Iso Butane
- ☐ Ethyl Chloride

#### Refrigerator Dishes

- ☐ Glass
- ☐ Porcelain
- ☐ Safety Masks

#### Seals, Shaft

#### Resurfacing Stones

#### Strainers

- ☐ Expansion and Float Valve
- ☐ Liquid Line
- ☐ Suction Line

#### Switches

- ☐ Air Temperature
- ☐ High Pressure Control
- ☐ Low Pressure Control
- ☐ Pressure
- ☐ Temperature

#### Thermometers

- ☐ Air Temperature (Cooling)
- ☐ Air Temperature (Heating)
- ☐ Brine
- ☐ Domestic Refrigeration
- ☐ Industrial Refrigeration

#### Thermometers

- ☐ Refrigerator
- ☐ Test
- ☐ Tool Chests

#### Tools

- ☐ Flaring
- ☐ Pinchoff
- ☐ Tube Bender
- ☐ Tube Cutter
- ☐ Wrench Sets
- ☐ Traps, Scale
- ☐ Trays, Ice Cube

#### Tubing

- ☐ Copper
- ☐ Finned
- ☐ Steel
- ☐ Tinned

#### Unit Blowers

#### Valves

- ☐ Automatic Expansion
- ☐ By Pass
- ☐ Check
- ☐ Compressor
- ☐ Expansion
- ☐ Flapper
- ☐ Magnetic
- ☐ Pressure Reducing
- ☐ Shutoff
- ☐ Solenoid
- ☐ Thermostatic Expansion
- ☐ Two-Temperature
- ☐ Water
- ☐ Valve Retainers
- ☐ Valve Stems

Write in Names of Products Not Listed

Name .....

Address .....

City and State .....

Business .....

Mail This Page to the

Refrigeration Service Engineer 433 N. Waller Ave., Chicago, Ill.

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to participate in  
the activities of the

## REFRIGERATION SERVICE ENGINEERS' SOCIETY



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## A Local Chapter . . .

in your city. The National Society will aid in the formation of a local chapter. Ten or more active service men are required to form a chapter. The National Society will assist.

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433 N. Waller Ave., Chicago, Ill.**

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one ☐ or ☐ I would like to have further information as to the formation of a local chapter  
both ☐ in my city.

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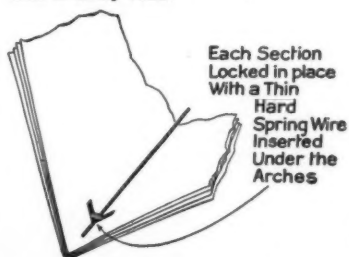
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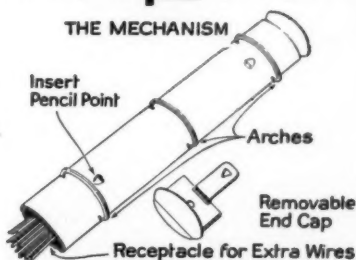
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